RAILROAD GAZETTE

SATURDAY, OCTOBER 12, 1872.

Locomotive Piston.

One of the first difficulties which presented itself in the construction of the steam engine was the making of a piston which would work steam-tight in the cylinder. A great amount of ingenuity has been exercised in this problem, and a description of the plans proposed would fill a large volume. At the present time there is a very marked tendency to abandon the more complicated contrivances and to adopt a more simple form of construction for this part of locomotive engines.

Our engraving represents a section of the piston and packing now used on the Pittsburgh, Fort Wayne & Chicago Railway by Mr. Boon, the Master Mechanic of the Western Division of that line. It consists of an ordinary piston-head and follower, with a ring, *D*, which has two grooves, *a*, *a*, *b*, *b*, turned in it to secure the small packing-rings. The latter are cut, while the ring, *D*, is left solid. The packing-rings are held in position by the pins *b*, *b*, represented in plan in fig. 1.

Mr. Boon thus describes the method of fitting up this packing:

"In fitting this packing the large ring, *D*, should be turned 1-32in. less than the bore of cylinder; the lugs in the piston should be turned about 1-8in. less than the large ring, *D*, is bored out, so as to permit the piston being adjusted to the center of the cylinder by placing liners between the lugs in the piston and the inside of the large ring, *D*. This lining up will be necessary: as the rings wear away, the piston will drop down out of center. The large ring, *D*, must be perfectly loose between the follower and the piston when the follower is bolted up; the small rings *a*, *a*, should be turned 1-8in. larger than the bore of the cylinder, and must have full 1-64in. play in the groove. The small rings being 1-8in. larger in diameter than the bore of the cylinder, they will have to be sprung into the cylinder. The holes *b*, *b*, in the small rings will allow the rings to be sprung in. We have been very successful with this packing, and have about eighty locomotives with it in, and also have it in our stationary engines. I am satisfied it gives better results and costs very much less than the old spring packing."

The Classification of Railroad Cars.

The cable announces that several English railway companies contemplate the abolition of class carriages and the adoption of the American car. Probably it is as yet a rather distant contemplation, for the average Englishman would just as soon think of swopping the magna charta for the declaration of independence, or Mr. Gladstone for Mr. Fish. But it is a serious and a practical question, whether the English traveling public would gain as much as they would lose by adopting the Yankee notion. That notion is a grand one, but in our opinion it is too expensive, and has been tolerated in this country a great deal longer than it ought to have been.

In the first place, it is a question purely of economy, not of caste, or class distinction at all. It is simply whether a road ought to furnish more than one assortment of accommodations. We don't think of caste when one of our dry goods firms offers prints at eight cents a yard and silks at $3. There is no caste in that. It is simply an endeavor to meet the desires of each man or woman and give them what they can afford. Neither is it caste when a man of wealth takes an orchestra chair and his stable boy the amphitheater; or when the head of a firm takes a body pew and his clerk a wing pew, or the former takes a hack and the latter a horse-car. In obedience to this fact or principle, we think it would be economical for all concerned if the classification of cars was adopted on American roads. Especially on the way trains out of the great cities, there ought to be plainly furnished, substantial cars for workingmen, seats in which could be afforded at a material reduction under the prices for the fine cars now in vogue. In Germany, where there are four classes of cars, the rates on the cheapest are so low that washerwomen often go by car to their work, with their tubs under their arms. Three classes, however, are sufficient —the Pullman car, the ordinary car and a car with easy spring seats, not upholstered, and plain interior. We do not believe that the American working classes are so stupid as to feel any discredit at riding in a car where the mirrors and black walnut trimmings were dispensed with, if it was clean and somewhat cheaper. It is not unusual for students, clergymen and professional men to patronize such on the continent for short journeys. We put the matter now solely on the ground of economy, and would not for the world recur to those annoyances which the delicate and feeble, or even the ordinary, daily-bathed and refined "genteel" people suffer from the proximity of people who are not clean, and perhaps not sober.

What the English and continentals need is not the indiscriminate system, but the classified American car. The European compartment car is an abomination. But if they will adopt our car and retain their classification, they will attain the acme of locomotive arrangement.—*Springfield Republican.*

Depot Regulations.

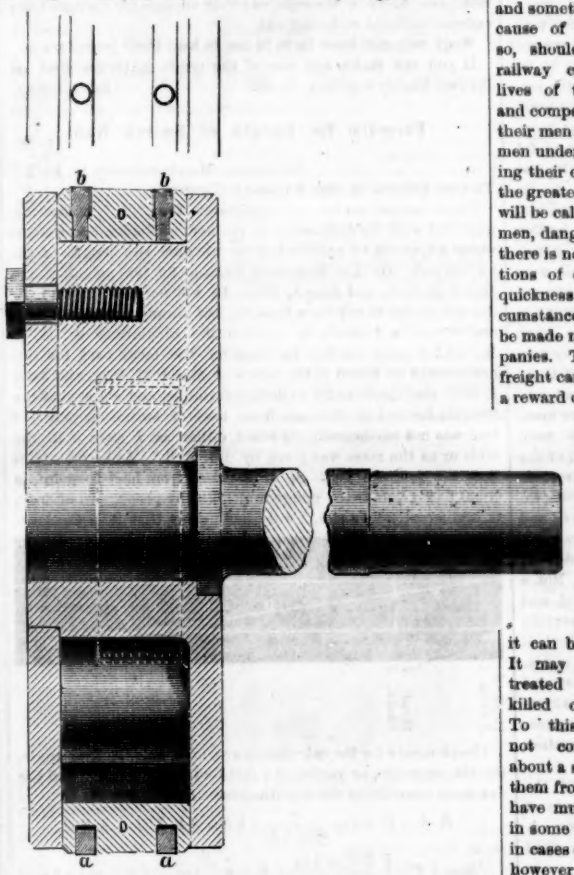
The Springfield *Republican* says: "The railroads in this country begin by throwing everybody on his own responsibility and giving the public the greatest liberty of access to cars and depots. The consequence is that the American people, usually law-abiding, resent as insulting the wholesome restraints and regulations which the vast increase and nicer management of our railway service render necessary. In depots like ours, it is absolutely essential that officials should be provided, properly badged and distinguished, and of intelligence and civility, to take charge of the crowd, and on the other hand it is necessary that the crowd should accept their guardianship in the spirit in which it is or should be tendered as a necessary lubricant to travel. As to the showing of tickets before entering, it ought to be insisted on more completely than it is. No one can get into a concert-hall or lecture-room without showing his ticket, but everybody is allowed to enter a car and be carried off some miles, losing irretrievable connections and perhaps valuable engagements, before being asked for his ticket or having it examined. When we get our new depot, we hope and expect to be thoroughly fenced out of all moving trains, to be divided up into proper flocks according to our several destinations, and finally to be successfully corraled in the proper vehicles, without so much as a single 'jaw' with an 'upstart brakeman,' or a single anxiety as to reaching the destination for which we set out."

Contributions.

Treatment of Employees.

To the Editor of the Railroad Gazette:

The treatment of employees on many railroads is so harsh and unfeeling that it seems high time something should be done for the amelioration of this class of people. The peculiarity of their work preventing those connected with the traffic department—and of these more particularly I speak—from joining in any of the crusades against capital for the reduction of the hours of labor, there is much reason to fear that in consequence of the lack of concerted action, the inability, in fact, to meet on a common ground to seek for the redress of a general grevience, railway operatives, alone of the great labor party, will be unable to lighten the burdens which now often press so heavily. And this difficulty is not the only, or indeed, the chief one; there are many causes for complaint besides, and, although it may not always be possible to diminish the number of hours of labor, it is quite possible for railway managers to have a good deal more care for the health and welfare of employees. We may, however, first consider the question of "long hours" as being the one most frequently heard of in this connection, and which appears to stare one in the face at the very threshold of any consideration of grievances. It may be difficult to say beyond what point human endurance should not be taxed for any reason less than the protection or preservation of life and property; but certainly an officer who continues a subordinate at a responsible duty until he is overcome by fatigue, when he



might have been relieved, assumes all responsibily for results arising out of such incompetency.

Recently an engineman on a long line taking out a freight train early Thursday morning returned Friday evening, after thirty-six hours continuous labor. He retired at once to rest, and after four hours' sleep was called to repeat the journey. He felt that he was unable to go, and said so, urging his complete exhaustion. No excuse, however, would be taken, and knowing his situation depended on compliance, he again started out, returning Sunday evening, having had but three hours rest in the meantime. A few weeks subsequently, the same man was required to endure still greater hardships, and has so completely broken down that he has been for weeks confined to his bed. It need hardly be added that a corporation so heartless as to exact so much was quite capable of the further heartlessness of stopping the man's pay from the date of his illness. This may be thought an extreme case; no doubt it is. Still, on the line referred to, such cases are of frequent occurrence, and in one instance at least has resulted in a deplorable loss of life and property. A telegraph operator who was required to receive and execute instructions for the crossing of trains after having been on continuous duty for days, notwithstanding repeated and urgent appeals for relief, became so exhausted as to be unable to receive a continuous message or write a line without dropping his pen and falling asleep. There were men at adjoining stations on either side who might have been sent to lighten the terrible pressure, but were not; and a shocking and utterly unnecessary slaughter of human life and an immense destruction of property were the finale.

These irregularities are, no doubt, the result of radical defects of management, and, as not occurring or not likely to occur on any well-managed line, may not be thought of sufficient importance to require for their avoidance general attention. Perhaps they are not altogether unknown on roads which aim at a somewhat careful management. At all events, if more publicity were given to cases of hardship or oppression they could hardly occur as frequently as at present.

Another indication of heartlessness on the part of railway companies is the neglect of employees disabled in service, or of the families of those who have died from the results of injuries received or of disease contracted while on duty.

The writer not long since addressed a letter to the head of the government in this country, suggesting the necessity for legislative action in compelling railway companies to adopt precautionary measures where possible for the protection of those servants whose duties expose them to more than ordinary risks. It was said in reply to this letter, that the subject was one of great importance, and if within the scope of legislative action, steps would be taken to meet the difficulty. The idea advanced in bringing the matter before the government was that when a man was killed or disabled from any cause which the railway company might have prevented, provision should be made by the company for those dependent upon him for support, and, in case of disability, for his own support as well.

By way of illustration, some of the avoidable dangers may be indicated, and of these the lowness of overhead bridges has destroyed the lives of many valuable train-men—surely an unnecessary destruction of human life, as in no instance might not such bridges have been hung a few inches higher. Another prolific source of death and disability is the defective coupling arrangement in use for freight cars and the position of the buffers so near the draw-heads that men in coupling, in their anxiety to avoid having their hands caught often forget the dreadful buffers which, closing on, catch and crush the arm and sometimes the body of the unfortunate brakeman; yet this cause of death and mutilation is remediable, and being so, should on no account be allowed to continue. If railway companies show so great a disregard for the lives of their servants, then the legislature should step in and compel them to leave nothing undone which the safety of their men requires. It is hardly to the point to say that the men undertake all the dangers incident to the position in making their engagements, but new men, for whom there exists the greatest danger, cannot fully comprehend all the risks they will be called upon to run; and besides, being generally young men, danger, instead of deterring, often is an allurement; and there is no doubt a fascination in being able to go into positions of danger where safety is only possible where there is quickness of eye and hand. The occupation is, under any circumstances, more or less hazardous, and certainly should not be made more so by any remissness on the part of railway companies. There are many patented self-couplers suitable for freight cars, and if none of these are sufficiently practicable a reward offered for a better would soon bring out something which would meet all requirements, but this will never be done by railway companies until legislative action compels it; and every year the increased railway mileage, uniformity of gauge and increased interchange of car renders the adoption of a new system, with the alteration of couplers on cars now in use, a more and more difficult and expensive undertaking. Still, as it is merely a question of expense on one side and human life on the other, a movement should be made by making railway companies pay for a life or limb to the utmost value which it can be shown to have been to those dependent thereon. It may be thought that this view of the case is being treated with undue consideration; that the number of killed or mutilated brakemen is very inconsiderable. To this it can be said that the writer, although not connected with the train service, has seen about a score of fatal or serious accidents to trainmen, most of them from dangerous coupling arrangements. Many railways have mutual benefit societies to which all employees can, and in some instances must, belong, which make weekly payments in cases of disability, or pay a fixed sum in case of death. This, however, is not sufficient; and an employee should feel that when compelled to go into a dangerous position the sacrifice he may have to make to duty will not be overlooked. There should on all railways be a fund established from which allowances could be made. This would seem to be the most appropriate disposition which could be made of the very considerable amounts which many companies levy on employees in fines, for the infraction of rules, and which often disappear mysteriously without reaching the general account. Here many distressing cases are constantly arising in which men have been rendered incapable of supporting themselves, while in the performance of their duty, and have been most heartlessly turned adrift, too often to die. An instance occurs to the writer in which a faithful man had lost an arm in coupling cars; the shock to his nervous system seemed also to have undermined his health, and he had not strength left for laborious work, although quite enough for any light occupation, such as watchman or messenger. He applied for a light porterage place, and was promised an appointment. He haunted the general offices for a year or more in daily expectation of the promised place, and in the end died, dissappointed and broken-hearted. No private individual or firm would be guilty of such heartlessness, and no large corporation should be allowed to be.

Once or oftener every year a terrible calamity, like a clap of thunder in a clear sky, startles the telegraphic world. It may be the dreaded fire-damp, a railway or steamboat disaster, or a great steamship may go down with all her passengers and crew in mid-ocean. The telegraph carries the intelligence to all parts of the civilized world, and the great heart of the civilized world throbs sympathetically; and yet a greater number of train-men are killed or mutilated every year than in all the great accidents put together. They drop quietly out of existence. Sometimes the morning's papers have a single paragraph —"Killed by the buffers"; but all the accidents at wayside stations go unrecorded, and always the "crowner's quest"

which sits on them brings in the sterotyped verdict of "accidental death," when it is generally the result of culpable carelessness on the part of the management in exposing the men to unnecessary danger; and if in such cases no action would lie as against the railway company, then the sooner the law is amended the better: where justice will not be done for its own sake there should be a way to compel it.

So far we have considered the duty which railway companies owe to their men in taking precautions for their safety and in making provision for those who have been incapacitated while on duty. There are besides other obligations which ought not to be overlooked. Every one of Napoleon's soldiers was taught to believe that he carried a marshal's baton in his knapsack, and every railway employee should be able to look forward to a certain advancement as the reward of faithful and intelligent service. The moral standard should be raised, vicious and fast men should not be employed in any capacity, and vacancies could then be filled by promotion from the next inferior rank without having recourse to men imported from other lines. The whole question of the treatment of the rank and file of railway service seems to require a good deal more of consideration than it has received. It is too much the custom for railway magnates to travel *en grand seigneur*, and each rank of subordinate officers to follow suit in lessening circles, in order, as it is said, "to maintain proper subordination." If this is necessary, if a man cannot know thoroughly every one subordinate to him without losing in respect and consideration, he is certainly not fit to be in authority. One superintendent of an extensive line travels in state monthly in a special car over the district he governs; at some of the more important stations he grandly alights with an extinguishing manner during the two or three minutes the train stops, but every smaller station is a *terra incognita*, one station master having assured the writer that in the number of years of his service he had never had an opportunity of speaking to the great man. The result is that when a vacancy occurs, the man most deserving is rarely advanced, the choice more frequently falling upon some one who for the moment may be most prominent; and again if any difficulty occurs it does not at all follow that it is the man in fault who is punished, but the man who is least skillful at defence. An instance came to the knowledge of the writer in which four men were connected with an affair, one of whom deserved commendation, one neither blame nor praise, and the remaining two the severest censure. Still, without allowing examination or explanation, all were heavily and equally fined—a treatment unjust in the extreme. A faithful and reliable staff is not formed by such means; in no walk in life will men perform a faithful service when they feel they are liable to unjust treatment, and railway men are no exception to this. In contrast to the management above referred to, the writer has seen a line under such perfect control and guidance that nothing seemed to go wrong, the manager thoroughly understanding his business and his men. Never neglecting for a moment his thorough supervision of the line, never unjust, and always maintaining a perfect system and subordination, he inspired the whole staff with his own sentiments of careful and honest discharge of duties, and every man felt he could not be neglectful or inattentive when his superintendent would have been careful and exact, and this feeling extended through all the grades of the service. Not a man but felt he was personally known and fully estimated, and however humble his position, he was treated with a certain respect if in his own sphere he was as careful and correct in the performance of his duties as the superintendent was in his. The result of this treatment was not only a most earnest and devoted staff, but one also with a personal and chivalrous regard for the chief, compelling a cheerful and ready acquiescence with all orders and regulations and a hearty execution thereof.

This was a treatment of employees, unfortunately, but too rarely seen, and until more attention can be given to details of management and less to personal interests—sometimes advanced by questionable means—it is useless to expect a good service.

Let it be understood that the health and safety of the employees are cared for, let an example of a conscientious discharge of duties be shown at headquarters, let the management be free from all stain of jobbery or worse, let the men be treated with fair consideration, with severity, if necessary, but with justice and without undue harshness, and the standard of the service will be raised, the work will be more efficiently done and working expenses will be reduced. J. H. McNAIRN.

Steam Excavators.

HOUGHTON, Mich., September 25, 1872.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Perhaps I can enlighten your correspondent a little in regard to "steam excavators," as the inventor was my oldest brother.

His name was William S. Otis, and at the time he was a resident of the city of Philadelphia. The first machine was built for him by Eastwick & Harrison, somewhere about 1837, and they afterwards built several, including two for the Russian Government, which were used in the construction of the Petersburg and Moscow Railroad.

Messrs. Eastwick & Harrison afterwards (in connection with Mr. Winans, of Baltimore,) went to Russia, where they built all the locomotives and rolling stock of this great Russian railway.

Mr. Otis died in the year 1839; at the time of his death he was one of the celebrated firm of contractors under the style of Carmichael, Fairbanks & Otis. Many of the foremost railroad contractors now living commenced as foreman for Carmichael, Fairbanks & Otis, among them such men as Sidney Dillon, O. S. Chapman and others.

These excavators have been, and are still, largely usedi n the construction of railroads and canals, and, in the shape of dredging machines, in digging out our harbors.

At the time of Mr. Otis's death his firm were engaged in constructing some of the heaviest sections of the Boston & Albany Railroad (then the Western Railroad), and were using steam excavators; among other points the sand cut just east of Springfield, Mass., was taken out by one of these machines.

The cheapest work ever done in the United States, if not in the world, was in the filling up of the great trestle bridge at Girard, Pa., on the line of the Lake Shore Railway. This embankment, of a *million* cubic yards, was made of earth dug by steam excavators. The contractors were Messrs. Dillon, Chapman & Clyde, and the work was done at a cost of not more than six cents per cubic yard, including digging, hauling and dumping, the contractors furnishing *everything* except the ties and railroad iron for the track.

The excavators are now built by Messrs. John Souther & Co., of Boston, cost about $8,000, weigh some 22 tons, last indefinitely (some machines are still at work that were built thirty years ago), and will dig and put into cars 1,000 cubic yards of sand or gravel per day; in fact, about the only limit to their powers in soft digging is the ability to take the material away *as fast* as the machine can load it. They will dig the hardest earth, and in fact some kinds of rock. The shovel holds 1½ cubic yards, and in sand they can fill this and dump the material into cars *twice in one minute*.

Three men are employed in running the machine, an engineer, cranesman and fireman; it consumes about one cord of wood per day, or its equivalent of bituminous coal.

They are locomotives as well as excavators, and can be fitted with extra wheels to run upon a 4ft. 8½in. gauge. They are used in working sectional tracks of 4-feet lengths, and after digging all the earth within reach move themselves up ready for a fresh bite; can make a through cut wide enough for a single track railroad without widening out.

Many railroads have them in use to load their gravel trains.

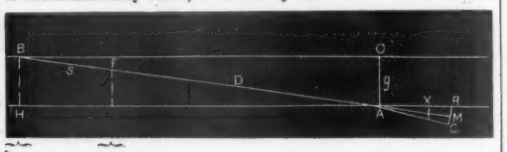
If you can make any use of the crude materials that are thrown hastily together, do so. ISAAC OTIS.

Formulæ for Length of Switch Rail.

ST. JOSEPH, Mo., September 10, 1872.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There seems to be the impression that "L." is not acquainted with the forty-seventh problem of Euclid, and that he needs a formula to enable him to calculate the length of the switch rail. He has furnished formulæ for that calculation in March 25, 1871, and June 1, 1872. In his note of July 15, he did not intend to ask for a formula, but simply to point out the omission of a formula in *words* in the calculations of "G. C. B.," and to point out the fact that for the most part his formulæ could be found in the tables of March 25, 1871, and June 1, 1872, also incidentally to defend formulæ, and show that the formula for finding distance from heel of switch to point of frog was not mathematically exact, either as I gave it in the table or as the same was given by "G. C. B." As he maintains that the formula D + S, or distance from heel to point, is equal to 2 *g l*, or twice gauge multiplied by proportion of frog, is mathematically exact, I will briefly show that it is an error.



Head of Switch. Head-Block.

The elements for the calculation are, first, half the frog angle, the side opposite, or gauge, in a right-angled triangle; and the unknown quantity is the hypothenuse—*B A* = *D* + *S*.

$$B\,A = D + S = \frac{g}{\text{Sine } \frac{1}{2}\,F} \cdot \quad \tfrac{1}{2}F = \tfrac{1}{2}\,B\,A\,C = A\,B\,O.$$

$$\text{Sine } \tfrac{1}{2}F = \frac{\frac{1}{2}\,B\,C \text{ or } \frac{1}{2}\,m}{A\,B \text{ or } x}. \quad D + S = \frac{g}{\frac{1}{2}m} = \frac{2\,g\,x}{z}, \text{ not } g\,l;$$

in which *D* + *S* = distance from heel of switch to point of frog, *O A* = *g* = gauge of track; *A M* or *l* = proportion of frog; *B C* or *m* = unity; *F* or *B A C* = frog angle. In the formula given in my table, *D* + *S* = 2 *g l*. *B O* is the distance found, and not *B A*, which is required.

One of your correspondents makes a difference between calculation for turn-outs from curves and straight lines.

Practically there is no difference in the data given in the the tables, whether for turn-outs from straight line or curves. Consequently two formulæ are not required.

If you wish to turn out from a 5 deg. curve on the inside and put in a one-to-eleven frog, your curve will be 10 deg. 2 min.; if on the outside, it will be a straight line.

If you turn out from an 8 deg. curve on inside with 1 to 11 frog, you will turn out with 13 deg. 2 min. curve, and on outside with 3 deg. curve; and in any case the position of head-block, main-frogs and crotch-frogs will be the same as given in my tables. C. LATIMER.

Mr. J. Dutton Steele and the Gauges.

NEW YORK, October 8, 1872.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I see that your able contemporary in Chicago is continually calling upon people to "remember that Mr. J. Dutton Steele, in his paper read before the American Society of Civil Engineers, found the same mechanical reasons in favor of both a 'standard' narrow and wide gauge."

Mr. Steele said, according to the printed proceedings of the society (see vol. 2, p. 58): "The gauges of this country hereafter will probably be four feet nine and a quarter inches and three feet, to be selected from local requirements; and the difference in the cost of building, equipping and working, and in the limits of capacity, will be nearly in proportion to the gauge."

If the narrow gauge is mentioned anywhere else in J. Dutton Steele's paper, or if any of "the same mechanical reasons"—meaning, probably, the results arrived at by Knight and Pambour—refer to the narrow gauge, I would like to have some observant person point it out.

There are some things—for example, the laws of gravity—that quacks cannot change. There are others, like the 4.7-foot gauge, that they had better not change much. N.

Sketch of the Plans and Progress of the Detroit River Tunnels.

[A paper read before the American Society of Civil Engineers by E. S. Chesbrough, C. E., member of the Society, at the Fourth Annual Convention held in Chicago, June 5 and 6, 1872.]

The first suggestion of a tunnel under the Detroit River* for railroad purposes was made to me about five years since by Mr. James F. Joy, President of the Michigan Central Railroad, with the request that the feasibility of the project might be ascertained as soon as convenient. In January, 1869, a report, accompanied by plans and estimates was presented to that gentleman. From these are taken most of the statements in this paper, so far as they relate to what was done previous to the actual commencement of the work.

In the preliminary examinations the first attempt was made to get a line at right angles with the river, not only across the stream itself but between the extremities of the approaches on each side. To avoid as far as possible damages to valuable property, the lower side of the city was selected. But boring showed very unfavorable ground there, and as the bed rock in that vicinity lies too near the surface for convenience, and is still nearer lower down the stream, further operations were necessarily confined either within the limits of the city or above it.

Careful examinations were made above the line first surveyed, by borings on each side of the river. When good ground was found on each side at points opposite each other, borings were made in the river between; but it was not until the vicinity of the Detroit & Milwaukee Railway depot was reached, that ground considered safe entirely across the river was met with.

A perfectly feasible line could be obtained entirely above the city, where the ground is very favorable, but in consequence of a greater length of tunnel and considerably longer new track being required nothing could be saved in expense by it, and much lost in convenience; for the line adopted makes the utmost possible use of existing depot grounds of the Michigan Central Railroad on the Detroit side, and will not require a great sacrifice of the station buildings and tracks of the Great Western Railway on the Canada side. These two companies are the parties most interested in the enterprise.

The line as finally determined upon commences at the Michigan Central Railroad passenger station, passes for a considerable distance along Jefferson avenue under the southwest corner of the Biddle House and the east end of the freight house of the Detroit & Milwaukee Railway, crosses to the other side of the river about half a mile above the terminus of the Great Western Railway, and unites with that road about one and a half miles further on, making the entire length of track between the two roads a little less than three miles. The length of tunnel is to be about 8,600 feet (3,000 of which is under the river.) The least curvature on this portion of the line is 2,300 feet radius, and the steepest grade, one in fifty.

Although the borings indicated favorable ground along the line adopted, except that possibly there might be a very troublesome amount of water from land springs, or springs having their source higher than the river, it was deemed prudent to avoid all risks as far as possible in planning the details of the work. For this reason, it was determined to have not less than twenty feet of roof between the top of the masonry and the bottom of the river. In no case, as far as could be ascertained, would there be less than twelve feet of stiff clay immediately above the tunnel.

To diminish the risk still further, it was determined to make two single track tunnels, circular in form, with 18½ feet interior diameter, instead of one large enough for a double track. By careful estimates, the first was found to be no more expensive than the other. Besides, for some years, one track would probably be sufficient, perhaps long enough for the saving of interest to build another—at least to go far toward it. This size of tunnel was adopted to give room enough for the largest Pullman car on either of the connecting roads.

The circular form was adopted, because of its greater safety in case a soil should be met with disposed to swell like the London clay. Mr. Storrow, in his Hoosac Tunnel Report, describes a case of this kind, in which, after two attempts to line a tunnel of the usual or horse-shoe form, with masonry, the circular form was finally adopted. The lining is to be of brick masonry, laid in cement, generally 24 inches thick under the river and 18 inches on land.

It is proposed to place the two tunnels so far apart under the river that, in case the second one should be delayed till after the completion of the first, an accidental cave would not endanger the stability of the one in use.

Experience in the construction of the river tunnels in Chicago teaches not only the convenience but the necessity of a drainage tunnel for at least half the distance across the river, in a work like this. It has been thought best to make it entirely across the river for the Detroit Tunnel, and for the following reasons:

First. It would be of great convenience and value, if much water should be encountered in the construction of the main tunnels.

Second. It would serve a very valuable purpose as a reservoir, should the machinery for pumping out the main tunnels happen to be disabled at the commencement of a great flood of rain falling in the open approaches at the ends of the tunnel, an occurrence that has taken place already more than once in Chicago.

Third. As the main tunnels must necessarily be curved part of the way under the river on each side, the drainage tunnel, after its completion, would form a most satisfactory base of alignment.

Fourth. The shafts at each end of it could be made to serve as working shafts for the main tunnels during their construction, and for ventilating purposes afterwards, should that be found necessary.

Fifth. A reason that did not occur originally, but is now quite apparent; it would afford the means of shortening the time necessary to complete the main tunnels under the river, and consequently the whole work one-half. This could be done by commencing operations at two points under the river, equidistant from each other and from the shore shafts. In this way, six working faces instead of two could be obtained, so that an average progress from each face of but two feet a day would insure the completion of the work in something less than a year. Of course, on each side of the river as many shafts could be sunk as might be found necessary to complete the land portion of the work as soon as that under the river.

The open approach on the Detroit side fortunately occurs in a wide avenue, and is situated between two streets, so that very

* All who are familiar with the Detroit River know that at the particular point where the tunnel is located, it is about half a mile wide, and runs from west to east or very nearly so.

little, if any, inconvenience will result to the public travel. It will be twenty-six feet wide, with vertical retaining walls on each side. The Canada approach occurs in an open plain, and will be a simple earth excavation, except at and near the portal, which is to be in fifty-seven feet depth of cutting. The estimated cost of the whole work is $2,650,000. This estimate was based upon the supposition that no machines would be used in removing the earth except to hoist it up the shafts. It was thought, however, that machinery operated by compressed air could be used, and diminish considerably the cost of the work. If one-quarter of the advantages claimed in the London *Times* of January 18 for Brunton's machine, now seriously proposed for boring under the Straits of Dover, can ever be realized, the cost of tunneling through firm ground will be greatly diminished.

It was recommended that the drainage tunnel be constructed before soliciting proposals for the main work, so that contractors might feel more certain of the nature of the ground, and thus be disposed to make lower bids than they otherwise would. This recommendation has been adopted by the companies chartered both in Michigan and in Canada.

Both shafts have been sunk to the bed rock. On the Detroit side this reaches to the bottom of the sump, or about eight and a half feet below the bottom of the drainage tunnel. On the Canada side the bed-rock is only two feet below the bottom of the drainage tunnel, and the sump will be sunk a few feet in it. From the Detroit shaft the drainage tunnel has been carried a little more than 600 feet out under the river, and from the Canada shaft a little less than 100 feet, or about 700 feet in all. The Canada shaft was not commenced for several months after the Detroit one was begun.

The rate of progress in this work has thus far averaged not more than one-half that which was expected, owing to the very hard ground, composed partly of bouiders. On neither side of the river, however, does the layer of boulders extend so high up as the bottom of the main tunnel, and only a few feet of its lowest portion will be in hard-pan. The ground passed through in each shaft shows a great correspondence in position and character, from which it is inferred that the excavation of the main tunnels, under the river especially, will be through a stiff but easily worked blue clay. The fact that a seam separating two slightly different kinds of earth has been in sight most all the way thus far from the Detroit shaft confirms the belief that across the river the different layers of earth, except when cut away by the stream, are uniform in thickness down to the hard-pan, and dip slightly toward the south.

The principal precautions deemed important in the prosecution of the main work are these:

First. To require the contractors to have constantly a force composed, in part at least, of skilled laborers accustomed to mining in difficult ground, should it be met with.

Second. The use of a skeleton shield of iron or steel, which in case of necessity could be fitted out in front and around the sides of the excavation in advance of the masonry.

Third. Frequent probings or borings in front and on the sides, to give warnings of the proximity of bad ground. Even should there be no difficult ground to pass through, these borings would probably prove a safeguard in drawing off large volumes of gas gradually, and thus prevent serious, if not fatal, explosions. This course was found advisable in the construction of the Chicago Lake Tunnel.

Fourth. The use of a large tarpaulin on the bottom of the river immediately over the workmen. This was successfully used, if my memory is correct (the late fire in Chicago destroyed my books of reference), in passing a breach that had been filled with bags of sand in the Thames Tunnel, and it is believed could be equally useful in preventing a breach. It would require the employment of divers, who could also be very usefully occupied a great part of the time in probing the bottom of the river just in advance of the work to discover any deep pits or pockets of sand or silt that might exist.

The question has often been asked if it would not be cheaper and better to construct a bridge across the river at Detroit than to make a tunnel under it? Some engineers have looked into the probable cost of a bridge, and believe it would be preferable both on account of the greater economy in cost of construction and in maintenance afterwards; but this question has been set at rest for the present by the absolute refusal of the Canadian Parliament to grant a charter for a bridge so long as a tunnel is considered practicable.

Mr. CHARLES H. FISHER—I would ask Mr. Chesbrough if he would favor the use of the same tools and methods with which he made the borings?

Mr. CHESBROUGH—The borings were made with a wood auger,* such as I used in the construction of the lake tunnels here in Chicago, with which specimens from different depths were brought up. Of course, there was doubts whether these always came from the depth to which the auger was sent down, but we found afterwards that it was so in every case. The material which was drawn up with the augur came from the point where the augur ceased to be turned round. In Detroit we have practically relied upon this; but where, however, there is doubt, it would be best to sink a tube, such as is put down for artesian wells; but little of which has been done. The augur we used was one and a quarter or one and a half inches in diameter, and is large enough if the joints are properly made. A very good quality of iron is required to withstand the torsion.

A MEMBER—Will the material always stick to the augur if hauled through water?

Mr. CHESBROUGH—Not if it is very soft. In such cases we used a tube made of wrought iron; but when the augur stopped in stiff clay we could rely upon it.

A MEMBER—Did you have to remove the augur frequently?

Mr. CHESBROUGH—We generally drew it up once in about 10 feet, and it usually brought up the whole strata. In some instances we could not remove more than six inches of the strata, but it was very seldom.

A MEMBER—I understand that you bored that way to a depth of 90 feet?

Mr. CHESBROUGH—Yes; sometimes 80 or 90 feet were bored in a little over a day; again, to get a satisfactory boring it would take a week. Occasionally a boulder would be hit and the rods broken. Of course the rod was very long, so that one would think it would break in turning, but it did not.

QUESTION—If you struck a boulder rock you would not succeed?

Mr. CHESBROUGH—Of course not; boulders would stop progress in that place, but we would try in another.

* Like that commonly employed for boring wood

A Note to "Hoosier."

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have examined several of the papers written over the above signature, and would respectfully ask the following questions:

Will "Hoosier" give us a method, ignoring formulæ, for changing curves, when, the point of intersection of tangents being inaccessible, we assume a point at which to commence our curve, run it around, and find it does not join our final tangent? Also the same for reversed and compound curves? I ask this because the mere connection of two tangents by a simple curve is an exception rather than a rule; and, in angles of 40 or more degrees with a light curve, it is a very tedious operation, as well as an unnecessary one, to continually run to an intersection.

In a piece of woods, for instance, the line by the first method is unsatisfactory. The ground being rough and measured over two entirely different places, errors in chaining, which are unavoidable, will magnify. In the second case, some of your cleared line will almost always be in a place where it can be used by the second line, and the chaining being nearly on the same ground it can be done more nearly alike. Again, a good guess as to what ground the curve will be upon is all you can do in the first way, while by the second you see at a glance. There is no use of adding that of the two runs; those over the tangents will give the longest distance to chain. Again, in laying out trestling on curves, will he inform us why bisecting chords of 12 feet is easier, or (on account of the shortness of sight in turning your right angles) anywhere as nearly correct as turning on your radius (*i. e.*, a right angle to the tangent at any station) and setting your line stakes, when you can continually take long backsights, thus materially lessening the chance of error.

I would like to ask several more questions, but will not encroach further upon your patience or your columns. T.

OLD AND NEW ROADS.

Chesapeake & Ohio Canal.

At the monthly meeting of the directors at Annapolis, Md., October 3, the report of the President stated that the earnings of the canal for the month of September were $56,873.42 and the expenses $15,203.39, leaving a balance of $41,670.03. The increase in tonnage for the month, as compared with 1870, is 25,015 tons, and the decrease, as compared with 1871, is 13,586 tons. This decrease is attributed mainly to the unusually low state of water in the Potomac, by which the navigation of the Cumberland division of the canal is seriously interfered with.

Portland & Ogdensburg.

Regular trains on the Western Division have begun running from St. Johnsbury to Wolcott, which is seven miles beyond Hardwick, the late terminus, and the road is to be completed to Hydepark, eight miles further, this month. Work has commenced on the mountain section between North Conway and St. Johnsbury. On the projected line from Swanton to Ogdensburg, the township of Hinchinbrooke, Quebec, has voted $40,000 and Dundee $16,000 to the road. Other towns on the line are expected to vote aid shortly.

Oregon & California.

The Oregon *Commercial Reporter* says that the construction of this road is being energetically pushed forward in spite of the opposition it has met with. It is expected that 200 miles of the road will be completed before winter, and surveying parties are now running lines from the winter terminus of the road to the California line.

Flint & Pere Marquette.

This company has advertised for proposals for the grading, timber-work, ties, etc., for the remaining part of the main line from Reed City to Ludington, except the ten miles now under contract from Ludington east. The distance from Reed City to Ludington is about 48 miles.

Burlington & Missouri River.

The rumor that this company is to be consolidated with the Chicago, Burlington & Quincy has been revived.

Central of New Jersey.

The combination made by this company with the Delaware, Lackawanna & Western seems to have become distasteful to it already. The Central insisted on making its usual quarterly dividend of 2½ per cent., though the Joint Committee which was to manage the affairs of both companies, refused to authorize it. Then Mr. Moses Taylor, a director in both companies, protested against the Central's action and resigned his position in its board. The Delaware, Lackawanna & Western sued for an injunction to restrain the payment of this dividend, on the ground first that it had not been earned, and second that the Joint Committee did not authorize it. The Central's defense was that the arrangement with the Delaware, Lackawanna & Western is invalid, because a copy of it was not filed with the Secretary of State of New Jersey within 30 days after it was made. The Vice-Chancellor of New Jersey, before whom the case was brought, declined to issue the injunction, and the case will now be carried to the Court of Appeals.

St. Paul & Pacific.

A telegram from St. Paul, dated October 5, says that work on the St. Vincent extension (St. Cloud to Pembina), and also on the Brainerd extension (Sauk Rapids to Brainerd), was suspended last week, and 1,800 men were discharged.

Ohio Falls Canal.

General Weitzel's report on the Louisville & Portland Canal has just been submitted to the Engineer Department. It shows that since the last annual report the dam across the river at the head of the canal has been about half completed. The dam has been raised one foot, and 2,600 cubic yards of the rock ledge inside of the apron dam has been blasted, and 1,200 cubic yards of the same placed on the dam across the river. The enlargement of the entrance of the canal was completed, including new side walls. The widening of the whole main prism of the canal, the excavation of the new branch in the old canal, the excavations in the new branch, and lock-gates and machinery were all completed. The side walls are carried up to within about five feet of their ultimate height on parts 1, 4 and 5. On part 2 a small portion of these side walls were built, and all the stone delivered for the remainder of the wall. The high-water passage through the bridge was about two-thirds completed. The excavation of the rock ledge at the outlet of the docks was almost entirely completed. The appropriation of $300,000, made by the act of June, 1872, will be expended in completing the portions of the work. Amount received during the fiscal year, $420,000; amount expended, $519,152; remaining, July 1, 1872, $46,033. The amount required for the fiscal year ending June 30, 1874, and which can be profitably expended, and which will complete the work, is placed at $290,000.

Maine Central.

A wealthy citizen of Phillips, Me., has offered to build a mile of the most difficult part of the proposed extension from Farmington to Phillips, at his own expense, provided the company will complete the work within two years. The length of the extension will be 18 miles and the estimated cost is $25,000 per mile.

Burlington, Cedar Rapids & Minnesota.

The track of the Milwaukee Extension is laid to West Union, 13 miles beyond Clermont, the late terminus, and about 24 miles from Postville, the starting-point.

Marietta & Pittsburgh.

Trains are now running to Cambridge, O., on the Central Ohio Division of the Baltimore & Ohio Railroad, 52 miles west of Belaire, and ten miles north of Point Pleasant, the late terminus. The stations and distances from Marietta are: Caywood, 7 miles; Whipple, 14; Salem, 18; Kingsbury, 20; Elba, 22; Macksburg, 25; Dexter City, 27; South Olive, 29; Dudley, 32; Caldwell, 35; Ava, 42; Point Pleasant, 48; Byesville, 58; and Cambridge, 58 miles.

South & North Alabama.

The first train for Mobile and New Orleans, by way of Nashville, Decatur and over the South & North Alabama road, left Louisville on the evening of September 28. Two trains daily are to be run over this line.

Detroit & Milwaukee.

A branch road about a mile and one-half long is to be built from Corunna to the coal mines near that place. The new car shop at Corunna, a building 60 feet wide by 200 long, is completed, and the machinery is being put in.

Chicago, Dubuque & Minnesota.

Track laying has been resumed on the main line at the present terminus at Sumner, Minn., some 10 miles north of the Iowa State line. Track laying on the Turkey Valley Branch has been discontinued for the present, and the road is being ballasted between Turkey River and Elkport.

New York, Providence & Boston.

This company, whose road extends from Providence, R. I., through Stonington, Conn., to New London, 62½ miles, has just made its annual report for the year ending August 31, 1872. The general balance-sheet of receipts and expenditures for the year was as follows:

Balance cash assets from last annual report	$83,060 13
Receipts	911,020 74
115 bonds sold on account construction	115,000 00
	$1,109,080 87
Expenses	500,106 65
Dividends	169,866 00
Interest	77,056 13
Construction account	280,157 63
Balance cash assets carried to new account	83,894 46
	$1,109,080 87

The receipts were at the rate of $14,580 per mile.

Detroit & Bay City.

Cars ran to Oxford, three miles beyond Orion, and 38 miles from Detroit, September 21.

Ionia, Stanton & Northern.

The iron is laid from Ionia, Mich., north six miles to Wood's Corners.

International Bridge.

The Buffalo *Commercial Advertiser* of September 27 says:

"Another coffer-dam—for Pier No. 5 of the International Bridge—was safely sunk to the river-bed yesterday, in forty-two feet of water. On the 22d of August this crib was anchored 90 feet above its intended position, and there built to its present height of 46 feet, the whole structure gradually sinking during this time. Great care and attention was required with this coffer-dam, as it lies in the strongest current and in the deepest part of the river. It was necessary to place it with exactness. This, Captain Myer admirably succeeded in doing, and with it the worst difficulty is overcome. Only one more pier (No. 4) is wanting, for which another coffer-dam will be prepared immediately."

Peoria & Rock Island.

The Rock Island (Ill.) *Union* of September 28 says:

"The Supreme Court of Iowa has released the Davenport subscribers to stock in the Peoria & Rock Island Railroad from payment, on the ground that promises made as inducements were not carried out. Many subscribed to secure competition in coal, and the company purchased P. L. Cable's track on terms which continued the coal monopoly, thereby violating a vital condition. Another point made was, that the capital stock fixed in the charter at one million dollars had not been all subscribed, and that no assessment on the shares could be collected until the whole amount fixed in the charter had been subscribed. The decision releases all the Iowa subscribers to the Peoria road from paying their subscriptions, and also releases subscribers to other railroad companies from payment of installments when assessments have been made before the whole amount of stock fixed in the charter has been subscribed, unless the charter especially provides that the company may organize and proceed with a less amount."

Missouri, Iowa & Nebraska.

Trains commenced running to Griffin, Mo., a new station at the junction with the St. Louis, Kansas City & Northern road, and four miles from Lancaster, the late terminus.

A Brave Fireman.

An account of a noble deed is given in the following letter, which was written by James R. Clark, Engineman of Locomotive No. 127 on the Toledo, Wabash & Western Railway, to his Master Mechanic, Mr. T. G. Gorman, and has been widely copied in western papers. All railroad men will feel their occupation honored by this brave deed of George Wedgewood, who so deliberately risked his life to save a little child.

"Coming west this forenoon, with train No. 3, I saw something on the track, about two and a half miles west of Chatton station, which I at first supposed to be a dog, but on getting closer I discovered to be a little child about two and a half years old. I called for brakes, reversed the engine and pulled the throttle wide open. My fireman set the tender brake, ran out to the front end, got down on the pilot, and I should judge we were going fifteen miles an hour, when he caught the little thing up and fell back on the pilot with it, saving its life. In falling back with the child, to save himself, he hurt the little one's face slightly. I think that is all it was hurt. But for the bravery of George Wedgewood, it, in all probability, would have been killed, but as it was, I dont think the engine struck it at all. I thought best to report the case to you, as I think it was a very brave act of Mr. Wedgewood."

European & North American.

There is a rumor that this company is negotiating for the purchase of the New Brunswick & Canada Railroad, with the intention of extending the road from Houlton, Me., up through Presque Isle, thereby saving the necessity of building a line from Mattawamkeag to Houlton, about 70 miles. The New Brunswick & Canada road extends from St. Andrews, N. B., north to Richmond, 88 miles, with branches from Watt Junction, N. B., to St. Stephens; from Debec Junction, N. B., to Woodstock; and from Debec Junction to Houlton, Me.—in all, 126 miles of road. Its main line crosses the European & North American Railroad at McAdam Junction, N. B., 120 miles from Bangor.

South Side.

This is the name of a company which proposes to build a railroad from Pittsburgh west to Phillipsburg, in Beaver County, Pa., a distance of about 25 miles. Mr. J. P. Fleming is President of the company.

Sioux City & St. Paul.

A telegram from St. Paul, Minn., dated September 28, announces the laying of the last rail on this road. The entire distance from St. Paul to Sioux City is 272 miles, but for 26 miles, from Le Mars to Sioux City, trains run over the Iowa Division of the Illinois Central road.

[*Continued on page* 447.]

RAILROAD GAZETTE

Published Every Saturday.

A. N. KELLOGG & CO., *Proprietors.*
S. WRIGHT DUNNING AND M. N. FORNEY, *Editors.*
W. H. BOARDMAN, *Acting Publisher.*

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Editorial Announcements.

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

WARMING AND VENTILATING CARS.

In the RAILROAD GAZETTE of September 21 we promised to give in the paper of the following week some description of the methods in use for heating cars with warmed air. For reasons which need not now be explained, we have been unable to fulfill our promise earlier than in the present number.

The plan which probably has come into more general use for this purpose than any other is what is known as the Spear stove, a section of which is represented by fig. 1. It consists of a stove, *S*, surrounded with a sheet-iron casing, *e*, *e*; a hood, *h*, *h*, on the outside of the car, which communicates with the casing by the pipe, *f*, *f*. The smoke-pipe, *p*, *p*, passes up through the cold air pipes, *f*, *f*, and the hood, *h*, *h*. The latter is also provided with two valves, *r*, *r*, one of which opens and the other closes when the car runs in one direction, and *vice versa* when it runs the opposite way. By this means the air is forced into the hood and down the pipe, *f*, *f*, into the space between the sheet-iron casing and the stove, and escapes into the car by the openings, *k*, *k*. By coming in contact with the pipe, *p*, *p*, and the stove, the air is warmed and enters the car at a comparatively high temperature. As it becomes heated, however, by contact with the stove and pipe, it has a tendency to rise instead of passing downward as indicated by the darts with this arrangement; therefore it is difficult and sometimes impossible to force the air into the car when it is running slow, or the wind is unfavorable. The manufacturers, therefore, modified the plan, by making the cold-air pipe, *f*, *f*, fig. 2, entirelyindependent of the stove-pipe, and attaching it near the bottom of the casing, *e*, *e*. In this way the cold air falls down, which is its natural movement, and, as it becomes warmed, rises and passes around the stove as shown. With this second plan they also constructed a flue, *g*, *g*, which extends along the whole length of the car with branches under the seats as shown, and a register, *h*, in the aisle. In this way the heat is distributed through the whole car and to the feet of the passengers, where it is most needed.

With both these plans some difficulty was encountered from the hoods, *h*, *h*, which are placed on top of the car, and are fixed with their openings toward the ends of the cars. The difficulty is, that with a strong head wind *too much* air is admitted, and with a strong side wind either too little or none at all. This is especially the case with the plan of stove we have described first. To overcome this difficulty, therefore, a movable hood, *A*, fig. 3, with a vane, *V*, was adopted on the Illinois Central and other railroads. Fig. 4 is a plan showing the form of the top or cap. Our engraving is made on a larger scale than the other figures. *C* is a rod fixed in

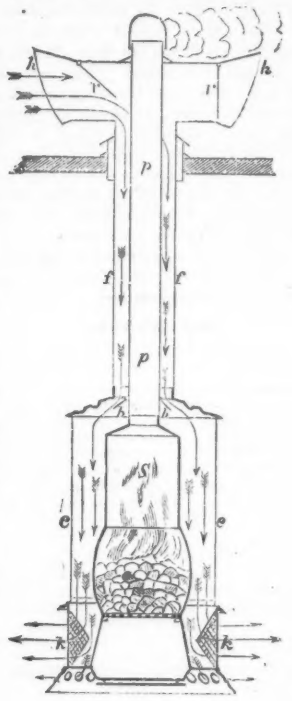

Fig. 1.

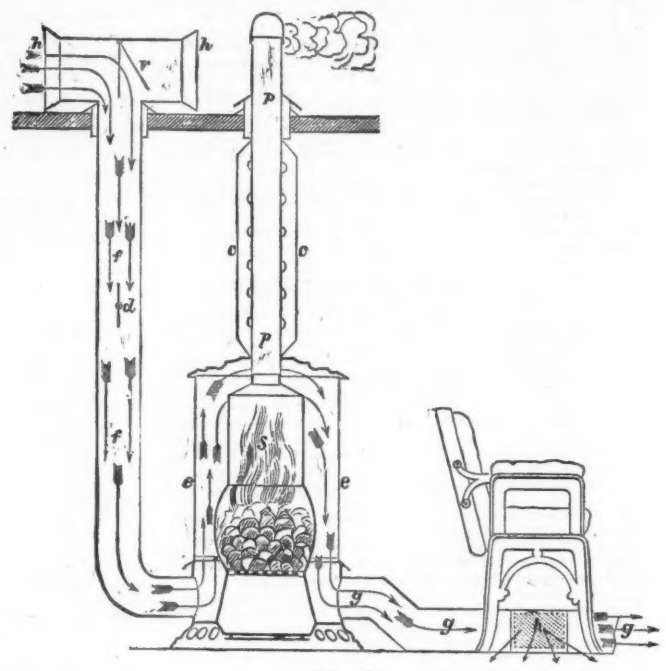

Fig. 2.

the braces, *D* and *C*. The cap or hood, *A*, rests on the end of this rod at *E*, and is held in position by the brace, *F*. The air enters at *B* and passes downward, as indicated by the darts. The diameter of the pipe at *C* is 8½ inches, and the mouth, *B*, is 6x12 inches, which is less than half the size of those shown in figs. 1 and 2, and it was found that it supplied an abundance of air. On the Northwestern road a similar hood is used, and it was found that the area of the openings for admitting air

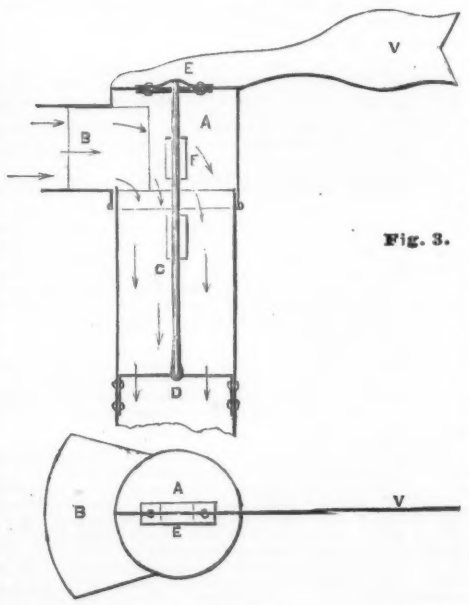

Fig. 3.

Fig. 4.

was made too large at first, and was afterward reduced. So efficient is this hood in admitting air that it was found that it would force an abundant supply down the pipe of the stove represented in fig. 1, notwithstanding its tendency to rise as it became heated. On the Illinois Central, therefore, they use that pattern of stove with the movable hood in preference to the other, owing to the more simple appearance of the former, and also because the cold air around the stove-pipe protects the wood-work better from the heat.

These hoods can very easily be used for exhaust ventilators by simply reversing the vanes, *V*, and in many cases they are made in that way and used for that purpose. That a movable arrangement of this kind is somewhat more liable to get out of order, and requires more attention and care, is quite true; but the advantages which it possesses over the fixed hood, we think, much more than compensate for the additional care required. They have also been condemned in some cases, more because their construction was bad than on account of any inherent defects in the plan. Whenever they are made like ordinary sheet-iron and stove-pipe work there will be sure to be trouble with them sooner or later—usually sooner; but if they are made considerably stronger, and the joints and moving parts carefully fitted, they will not often be out of order, and will give very little trouble.

They should be placed on the top of the raised roofs of cars, so as to make their movement perfectly free, and so as to be exposed to the wind without obstruction. On some roads, where the bridges or tunnels are low, it is difficult and sometimes impossible to get room enough for them in the position named, but by keeping them as low as possible there is usually no difficulty from this cause.

These hoods can be used with *any* stoves, and either with or without the flue *g*, *g*, fig. 2.

With the stoves and arrangements we have described it is impossible to warm a car without introducing a current of fresh air and thus accomplishing the double purpose of warming and ventilating at the same time.

In warming with hot air, however, there is always a difficulty in supplying the requisite quantity of moisture to the warmed air. The reason of this is, that warmed air will hold much more moisture in solution than cold air, so that the cold air which is admitted from the outside, and then warmed, will, when it enters the cars, have a strong affinity for more moisture, and will absorb it from any object with which it comes in contact, such as the furniture, or the skin of the persons in the room, thus producing that disagreeable, dry, feverish sensation so characteristic of the atmosphere which comes from many hot-air furnaces. In those intended for heating houses, the requisite amount of moisture is usually supplied by evaporating water from an open pan, so placed that the hot air can come in contact with it. In cars, however, this could not be done without some inconvenience, or special appliances intended for the purpose; and if the warmed air is saturated with as much moisture as it will hold in solution, it will be condensed on the windows and any other cold surface with which it comes in contact. The condensation on the windows, especially in freezing weather, is a serious annoyance, and it is therefore very questionable whether the dry atmosphere, with its uncomfortable and unwholesome effects, is not preferable to the annoyance of condensed or frozen vapor on the windows of cars. If we are obliged to choose between a pure, dry, warmed atmosphere and one which is foul from the exhalation of a car full of people, there will certainly be not much difficulty in choosing.

As we propose to refer to this subject again, and give some more plans which are in use for warming cars, we will leave the consideration of the relative merits of heating by convection and radiation for a future article.

In order, however, to show the progress which has been made in relation to this subject and the attention which it is now receiving, we append hereto a circular which has just been issued to the master car builders of the country by a committee appointed at their last annual convention:

"*To Master Car-Builders and Foremen of Railway Car-Shops:*

"GENTLEMEN—The undersigned, a Committee appointed by the Master Car-Builders' Association at their recent annual meeting, at St. Louis, on the subjects of Heating, Ventilating and Lighting Passenger Cars, beg to submit to you the following interrogatories, framed for the purpose of eliciting information to be reported by the Committee to the next annual meeting. The undersigned hope that your interest in these sub-

jects, and a mutual desire to promote the usefulness of the Association, will insure an early reply to each interrogatory:

"1st. How many cubic feet of fresh air do you think should be supplied to each passenger per minute, in order to keep the air in a car pure?

"2d. In your opinion, what are the best means for admitting this quantity of air into, and what for exhausting an equal amount from, cars in cold weather?

"3d. Have you heating and ventilation combined? If so, how is it accomplished, and what are the results?

"4th. What kind of stoves and fuel do you recommend for heating cars?

"5th. What, in your opinion, are the best means for protecting cars from the damage of fire, in case of accident to the train?

"6th. How are the cars on your road lighted? with gas, candles or oil? if the latter, what kind of oil?

"7th. Please state how the cars on your road are ventilated and warmed, and the number which use the various plans, with the general results; and give any other information relating to these subjects which you may think will be valuable to the Committee.

"All replies should be addressed to the Chairman of the Committee.

"V. D. PERRY, Chairman,
"*Hartford, Providence & Fishkill R. R., Hartford, Ct.*
"W. E. CHAMBERLAIN,
"*Boston & Albany Railroad.*
"A. GLEASON,
"*Old Colony & Newport Railroad.*"

If the persons to whom this circular is addressed can only be induced to consider carefully the first question, and give an intelligent answer to the second, we believe it will result in the greatest improvement which has ever been made in the ventilation of railroad cars. We therefore urge upon all master car-builders and others to give a careful consideration to the questions which touch the vital points of the problem. Those who are interested in the subject and who wish to investigate it still further we recommend to read "Leeds on Ventilation," published by Wiley, of New York; or Huxley's "Elements of Physiology," by Macmillan—an admirable book—and also an article which appeared a few months ago in the *Popular Science Monthly*, published by the Appletons.

Whether they read these books or not, we trust they will consider and answer the questions of the Committee very carefully, and if they do we believe it will result in length of days to themselves and their families and great comfort to travelers generally.

The Preservation of Engineering Records.

It may not be amiss to call the attention of the officers of railroads to the importance of preserving the records of the surveys, location, etc., of their lines, the reports specifications and plans of bridges, buildings and other structures, and the drawings of all machinery built either by or for them. We have frequently had occasion to lament the almost criminal carelessness in this respect of those who should naturally be the conservators of all such records. It is now with the utmost difficulty that drawings of the early locomotives and bridges built in this country can be found. On many roads no such thing as a correct map or profile of the line can be had, and the notes of the engineers who located it are scattered to the winds. Drawings are often not even protected from the ravages of dust and accident, and are piled in heteroge neous confusion, so as to be quite inaccessible. Those of most value are often carried off by covetous draftsmen or others with a taste for such things, and, there being no record of them, their loss is never known. There are few railroad offices where any system of record or classification exists, and in a few years, when any reliable drawing is needed, it cannot be found, and much valuable information thus passes into oblivion.

The writer while in charge of the records of the machinery department of several said roads adopted a system which was simple and, if properly carried out, answers the purpose sought. It was simply to have labels printed similar to the following:

> Machinery Department—TORRID & FRIGID RAILROAD.
>
> DRAWER A.
>
> NUMBER .....
>
> ☞ *Keep this drawing clean and return it to the draftsman.*

The drawings were classified and the drawers lettered to correspond. One of the labels was pasted on the corner of each drawing, and numbered consecutively in each class. The title of the thing represented was lettered distinctly on the drawing, and no one who makes any pretence of being a skillful draftsman should ever fail to designate his drawings, and also give the scale and the date of its completion. A drawing record-book was then kept, which was divided into appropriate spaces for each class, the numbers entered consecutively, and the titles of the drawings opposite the numbers. By this means a correct list is kept, and at the same time the book indicates exactly where the drawing can be found, if it is in its place, as the number determines its position in the drawers.

We believe these labels would be more convenient if they were made of the form of a right-angled triangle, with the base and perpendicular each about two inches long, and attached to the corner, in a position similar to that of the "return" notice on the RAILROAD GAZETTE envelopes, a sample of which any one can have for the asking.

To preserve drawings, we have found a case of shallow drawers, not exceeding 2½ inches in depth, to be the best things for the purpose. In order to prevent the paper from sliding back and getting behind the drawers, and thus be in danger of being torn when they are closed, a strip of board about 4 inches wide and ⅜ inches thick should be let into and nailed to the top of drawers at the back. This will keep the paper from curling up behind and being injured by the opening or closing of the drawers.

This, like all other systems, implies that a careful person should have the care of it. If it is carefully kept up as drawings are completed, it will be very little work; but if it is neglected its value is to a great extent lost. A good and competent draftsman with some intelligent supervision are the chief requisites to make the system efficient.

The Vermont Central Statement.

On Wednesday of last week there was a meeting of the security holders of the Vermont Central and Vermont & Canada railroads in Horticultural Hall, Boston, at which the trustees and managers of the property submitted through Mr. J. Gregory Smith, the President, a report of the condition of the affairs of the companies. This report, with that of the Treasurer, would cover more than three pages of the RAILROAD GAZETTE, and we can only hope to present its most essential features.

The managers begin by deprecating the attacks which have been made upon them and upon the property they control, saying that "It is a source of regret" that such charges should have been made by any journal, "until at least it was well assured from a proper examination of all the facts, that the charges could be sustained, and were, in fact, true." However loose and incorrect the charges of newspapers against this corporation may have been, we hardly think the managers should blame those who made them for lack of information. If we are not mistaken the managers have kept nearly all information concerning the roads they managed, their traffic, contracts, leases, etc., pretty much to themselves; and though the giving of false information cannot be excused, the newspapers should not be blamed for giving the best they could get.

The managers recite the history of the property from the time of their connection with it as trustees. The Vermont Central was the lessee of the Vermont & Canada, and was largely in arrears for the rent. The Vermont & Canada had a suit pending for the possession of their own road, and of the Vermont Central as well. The bondholders of the Central denied the validity of this lease, and its first mortgage bondholders had sued for foreclosure, their interest not being paid. At the same time the Vermont & Canada was required by an act of the Vermont Legislature, as a condition of the renewal of its charter, to construct a costly connection with the Rutland & Burlington road. Meantime both roads were in very bad condition and fast growing worse.

At last a settlement was made by which the validity of the Vermont & Canada lease was acknowledged and some provision made for the payment of rents overdue and accruing, and for the construction of the Burlington Branch by a better and cheaper route, and the consent of all parties was secured in the fall of 1859. By a new compromise the overdue rents of the Vermont & Canada were partly capitalized, and the capital of that company increased from $1,348,000—which, by the way, is at the rate of $23.240 per mile—to $2,000,000, or $34,480 per mile. The coupons of the second mortgage bonds were surrendered, and the bonds, then overdue, renewed for 25 years. Its stock, moreover, was increased by $250,000, to pay first mortgage coupons. By the terms of this agreement the road was to be held permanently by the Court of Chancery, the property to be managed by trustees, and the profits to be distributed among the security holders, according to their priority.

The position of the managers, therefore, has been unique. They have had in charge a property to be administered as a trust, which they should have attempted to make yield a steady income, and not withhold or endanger its profits one year in the hope of permanently increasing the value of the property.

From this time, the managers say, the business of the line improved rapidly, making necessary improvements in the road and an increase of rolling stock faster than the profits would pay for them. The Burlington Branch was built out of earnings, the Stanstead, Shefford & Chambly Railroad was bought, and money was needed faster than it could be earned. In 1865 authority was obtained to issue a loan for ten years, and the first equipment bonds were issued. In 1867 an additional issue of $250,000 of stock in the Vermont & Canada was authorized and made, and the proceeds used for the extinguishment of maturing obligations. Authority was given also for an issue of $500,000 of the notes of the trustees and managers, secured by a pledge of the stock and bonds of the Stanstead, Shefford & Chambly, to be delivered in payment of coupons; also the trustees were authorized to borrow $300,000 at one time, and $1,000,000 in 1869; and in 1871 to add $500,000 to the capital stock of the Vermont & Canada, and in the same year to issue their own notes guaranteed by the Vermont & Canada to pay sundry expenses and liabilities. The entire amount of interest-bearing securities, chargeable upon the Vermont Central Company—or its security-holders—is now given as $9,500,000, on which the annual interest is $725,000. The company is also liable for the interest of $500,000 of Missisquoi Railroad bonds, though not for the principal, and this brings up the annual interest charge to $760,000. The $2,000,000 of second-mortgage bonds are omitted from this estimate, as not being urgent. Without these, and giving credit for $500,000 of Stanstead, Shefford and Chambly bonds, the Vermont Central and Vermont & Canada, with 184 miles of road, are chargeable with the interest of $51,000 per mile, which amounts to something less than $4,000 per mile. The gross earnings of these roads for the *two years* ending with May last were at the rate of about $20,070 per mile, and the net earnings $6,350 per mile.

The floating debt on the 1st of June was $2,878,164.42, and the available assets $1,342,249.57. The deficit consists largely in the excess of rentals and expenses over earnings of the Ogdensburg & Lake Champlain and the Rutland railroads which, it is reported in the statement, were taken "with a full recognition of the fact that loss would ensue, in all probability, for the first few years." The lease was thought advisable in spite of this probability of an immediate loss, and was advised by all parties interested who were consulted. With reference to the charges concerning extravagant rents for the cars leased of car companies in which the trustees and managers are interested; the statement says the completion of the Red, Blue and White lines in New England seriously threatened the Vermont Central's through traffic with the West; that cars with an adjustable gauge were necessary for a through line over the Vermont Central, and that the patent system used on the National Dispatch cars "was an experiment, and so uncertain in its results that the several companies constituting the line did not feel justified in investing in the enterprise as corporations." "To encourage it, many gentlemen connected with the different roads in the line came forward and subscribed for a portion of the capital stock." For the first 200 cars put on three cents per mile was paid; afterward others were added at 2½ cents per mile, and still later the rate for additional cars was reduced to two cents per mile.

The Vermont Iron and Car Company was found to supply cars for lumber traffic. It supplied 200 for 2½ cents per mile, and the result of the contract is reported to have been a profit to the railroad company.

The New London Northern Railroad was leased by three of the managers in December, 1871. "There existed at the time substantial and satisfactory reasons why the lease could not then be taken directly to the trustees and managers." It has provisions for its transfer to the Vermont Central. The same is true of the Sullivan Railroad. The Montreal & Vermont Junction road is not leased, but is owned by two of the Vermont Central managers, and worked temporarily by that company for 50 per cent. of its gross earnings.

The managers claim to have administered their trust conscientiously, to have kept their accounts always open for the inspection of the committee of the bondholders, who by the decree are the special auditors, and who have made such examination as often as once in six months. They have aimed to bring the property into the most efficient condition, and believe it is capable of meeting in a little while the expectations of the most sanguine. They say it can now be worked cheaply, and will need little expenditure for new construction, and that its earnings heretofore have increased at the rate of 13 per cent. annually. The pressing necessity is to provide for the floating debt. To do this the trustees and managers have been authorized to issue their notes for $2,500,000, payable in 30 years at 8 per cent., constituting them a special lien upon the trust property. Of this $700,000 is to be deposited for retiring the first equipment loan of $700,000 which matures in 1875, and the balance is for paying the floating debt. If these are taken by the security-holders, or sold at once, the road would be unembarassed.

It is recommended that a plan be matured for organizing in a corporation, and thus putting an end to the trust.

Erie's Prospects.

The New York *Herald* has interviewed the Erie management in the person of President Watson, and Mr. Watson not only permitted himself to be interviewed, but talked pretty freely and told some truths which must disgust utterly that party which in England has claimed that to sell the shares at less than 80 is a useless sacrifice, and that this year and hereafter 7 per cent. dividends on the common shares might reasonably be expected.

Mr. Watson said in reply to a question as to the chances of the shareholders ever getting a dividend that it is still subject to a multitude of contingencies, and that in his opinion the only way to this desirable end was to change from the broad to the standard gauge, and he went on to point out some of the disabilities which its exceptional gauge imposes on the Erie—such as have been frequently pointed out, and occur readily enough to every railroad man. He said also—what has been announced before—that this change of gauge has been decided upon, and that it would be accomplished within the next five years; but he said also *that during this period the common shareholders will not receive a single dividend.* This seems cold comfort to those who buy for 50 or more now. In five years, if their money is worth 7 per cent., their shares will have cost them 70. This, it is true, will be cheap enough for a 7 per cent. stock; but Mr. Watson does not promise that the road will earn 7 per cent. dividends or any other after the change of gauge; he says only that it cannot earn dividends without the change.

Mr. Watson is also reported to have said that the cost of this change will probably be from $20,000,000 to $25,000,000. To *renew* the entire line, branches, sidings and all, with steel rails at the present high prices, would cost little more than $15,000,000; and what is needed is not new tracks, but narrower ones; and to shift the rails would cost comparatively little, and to lay a third rail on the main track, which is all that will be needed for years, or until the broad-gauge rolling stock is worn

out on the branches, etc., when their tracks can be changed without using any new rails—to lay a third rail on the main lines should cost not more than five millions, while standard-gauge rolling stock would be needed immediately not at all for local business, and not for through business originating east of the lake terminus, but only for that through business which comes from or goes to points beyond the Erie and not on the Atlantic & Great Western.

President Watson is certainly right in saying that the traffic of the Erie must be limited so long as its gauge separates it from nearly all other railroads. Now it can take traffic from other railroads only at a considerable disadvantage. It is not always easy for it to get as much for carrying, especially where promptness is important, and if it receives the same, it costs it more to do the work, on account of the transfers made necessary, so that rates which may give other lines a small profit may only pay its expenses. With the standard gauge and a bridge or transfer ferry across the Hudson, too, it might become a carrier for the New England States, which now afford its great rival an enormous and fairly profitable business.

Overwork.

A contributor in an article entitled "The Treatment of Employees," which we publish elsewhere, makes some statements concerning the overworking of trainmen, and mentions instances such as we did not think could occur in this country, except as the result of accident; and we still think that such cases as Mr. McNairn mentions must be extremely rare, at least aside from the particular line with which he is familiar. We have taken considerable pains to investigate this particular subject; and while we have found examples of overworking, they have almost in every case occurred on account of some derangement of business or other accident, which perhaps might or might not have been foreseen and provided against. Generally, so far as we have been able to learn, the work laid out for each man to do is not excessive—that is, not more than he is able to do well and without danger of exhaustion; for here we do not purpose to consider the subject of the proportion of the work required to the pay given.

It is, however, quite possible that the danger resulting from overworking trainmen is not sufficiently appreciated by managers, and that they do not always make that provision for emergencies which a proper sense of the necessity of keeping such men not only awake but alert would compel. Hardly any emergency would justify putting a man in charge of an engine who had had but four hours' rest in the previous forty; it would be an invitation of disaster for which those directing or permitting such service should be held responsible. It may be of great importance to dispatch a train on time; but to press in a worn-out engineman in order to do this would be as criminal as to use a worn-out engine on the train. There are human statics and dynamics whose laws—not definitely determined, perhaps—we may not violate.

Record of Track Increase.

In this number of the RAILROAD GAZETTE we give information of the following new constructions:

Atlanta & Richmond Air Line, extended from Gainesville, Ga., northeastward 22 miles; completed from Charlotte, N. C., west by south 50 miles to the Broad River in South Carolina, and from Spartanburg, S. C., 6 miles eastward and 9 miles westward—a total new mileage of 87 miles. *Cairo & Vincennes*, extended on different sections 37 miles since last noticed, making a total of 85 miles completed. *Milwaukee & St. Paul—Chicago Extension*, completed from Milwaukee southward 30 miles. *Portland & Ogdensburg—Vermont Division*, extended from Hardwick westward to Wolcott, 7 miles. *Milwaukee, Lake Shore & Western*, extended southward 7 miles to a point 22 miles south of Sheboygan, Wis. *Chicago & Northwestern—Menominee Extension*, extended 15 miles northward to a point 20 miles north of Menominee, and from Escanaba 5 miles southward. *Winona & St. Peter*, extended 20 miles to a point 76 miles west of New Ulm. *Green Bay & Lake Pepin*, extended from New London, Wis., westward 25 miles. *Sabula, Ackley & Dakota*, extended from Oxford Mills west to Virogua, Iowa, 18 miles. *Chesapeake & Ohio*, extended from White Sulphur Springs, W. Va., westward 35 miles. *Houston & Texas Central*, track extended from Dallas, Texas, northward 15 miles. *Montrose* (narrow gauge), extended 5 miles to a point 10 miles north of Tunkhannock, Pa. *Delaware & Pennsylvania*, track laid from Delaware City northward 8½ miles.

This is a total of 205½ miles of new railroad.

Height of Car Draw-Heads.

At the fifth annual convention of the Master Car Builders' Association it fixed the standard height of draw-bar at 2 feet 9 inches. An error either of printing or publishing the report of the fifth convention held at Richmond has rendered necessary the following correction, which the Secretary has just issued with the last report. Those who have the fifth report will do well to make the correction in their copy:

"On page 46 of fifth annual report, 16th line from top, for 'Mr. Myers' amendment,' read *Mr. Ford's amendment*; by which it will be seen that the standard height of draw-heads from top of rail to center of draw-head, for passenger and freight cars, is 2 feet 9 inches."

"SATANIC" is the only term by which we can qualify the selfishness of men capable of some crimes, and if there are any crimes which should excite public and private indignation more than any others, they are those by which the lives and limbs of multitudes of innocent and unoffending travelers are exposed to danger, to gratify the malice or sordid rapacity of creatures with the physical but with few of the moral characteristics of civilized humanity. If in the heat of passion or through the bitterness of his own wretchedness a poor creature either kills or injures another, the law and public and private indignation follow him with all their force. If without any of these motives, but with cool deliberation and no other motive than avarice, a miscreant exposes a whole ship-load of people to the most awful and sudden destruction, there is hardly any punishment too severe for him. That there are such people in the goodly city of New York is indicated by the following account which we copy from the New York *Herald*. If found guilty of the charge we hope the parties will be punished to the full extent which the law will allow:

"While the steamers Charleston and South Carolina were being loaded on Saturday one of the cases gaped open, and it was discovered to contain fireworks. This fact was reported to Mr. S. Hopper, Superintendent of the Coastwise Department of the New York Custom House, who had the case opened and found it to contain fireworks of every description and other manufactures from gunpowder. Nine more cases, all bearing the same mark, were opened and the contents all found alike. As these boxes were invoiced as fancy goods, in violation of the law, they were at once seized as contraband and sent outside the fire limits. The penalty for this offense—viz., shipping explosive material under disguised marks—is a fine of $2,000 and imprisonment of no less than one and no more than five years. It is stated that the shippers of these ten cases have forwarded many more goods of the same kind by Southern vessels within the past month, for which they will be apprehended. There was powder enough in the ten seized cases to blow two steamers into eternity."

THE KANSAS RAILROADS, like those of Iowa, seem to have progressed backwards in 1871, so far as traffic is concerned. The State requires statements of the gross receipts per mile of road to be rendered each year as a basis for assessments. The reports for 1870 and 1871 were as follows:

	1871.	1872.	Percentage of Increase or Decrease
Missouri River, Fort Scott & Gulf...	$7 248 70	$4,247 72	—41.4
Kansas Pacific.....	5,110 78	4,635 86	— 9.3
Leavenworth, Lawrence & Galveston	3,159 67	3,119 78	— 1.3
Atchison, Topeka & Sante Fe.....	4,180 13	3,498 98	—16.3
Missouri River Railroad.....	5,606 00	3,695 00	—16.2
Missouri, Kansas & Texas.....	1,759 99	1,770 85	+ 0.6
Central Branch Union Pacific	2.384 26	1,790 42	—24.9
Leavenworth, Atchison & Northw's'n	2,461 00	2,009 00	—18.4

Thus we see that only one road of the eight shows an increase, and that is less than one per cent.; while of the other seven two have decreased nearly one-sixth; one, still more; one, one-fourth, and one no less than two-fifths. This, be it remembered, is in receipts per mile. Many of these roads opened a largely increased mileage after 1870, and this chiefly in a new country just beginning to be settled, and it could not be expected that these should keep up their average on all the new mileage; however, it is bad enough at best, and looks very much as if some railroads in Kansas had been built before their time.

Considering their lines with reference to their receipts, without reference to their progress, we see that in 1871 the best of them had very light receipts; and if we allow two-thirds for working expenses, the amount remaining as the income of the capital invested varies from $1,545 to $590 per mile, which would pay 7 per cent. interest on $22,071 and $8,428 respectively—not very liberal allowances for the cost of a railroad per mile. This, however, is not saying that these investments have been unwise. However unprofitable now, in their beginning, some of them are pretty sure to pay with usury for all delayed dividends, and besides most of them have secured very valuable properties of lands which will eventually give a very large income.

THE TOLEDO, WABASH & WESTERN is reported to have made a combination with the Canada Southern, the effect of which will be to turn over to the latter all the through traffic which has heretofore passed over the Lake Shore & Michigan Southern on its way to and from Buffalo. This, it is announced, is likely to be of very great value to the Canada Southern. Its effect on the Lake Shore is not enlarged upon, but some writers express the opinion that while the gain of it will be of great value to the Canada Southern, the loss of it to the Lake Shore will be only trifling, "because the local traffic of that road is increasing so rapidly." What possible effect the increase of local traffic can have on the profits of through traffic is not explained. If the Lake Shore by increase of local traffic after the withdrawal of the Wabash through traffic makes as much as it did before, still the loss of the Wabash traffic is just as truly a loss; for if it had been retained, the new local traffic would have been had just as surely and have been just as profitable. But it is possible that the value of the Wabash traffic has been exaggerated by some of that very large class who never have any more definite idea of the bulk of any traffic than that it is "large" or "small."

We have no complete statements of this business, but the Lake Shore & Michigan Southern report for 1871 gives the receipts for freight forwarded from and received at each station and from passengers leaving. We find by this that the total freight business of the Toledo station was $2,582,753; and from passengers leaving that station, $289,245. If we double the latter sum, to represent the receipts from passengers arriving in Toledo, we have the total receipts of the business of that station, $3,161,243. Now, besides the Toledo, Wabash & Western, the Dayton & Michigan and the Flint & Pere Marquette carry their through traffic to Toledo—doubtless altogether much less than that of the Wabash—and Toledo is one of the most active trading towns on the lakes, with a large local traffic of its own. Moreover, the Lake Shore will remain the only route for the Wabash to reach Cleveland, Erie, Dunkirk and the other flourishing places on the route to which a share of its traffic goes (and the share on which profits are largest). The working expenses last year were 66 per cent., and they certainly must have been greater on the very low-priced through freight, but with this proportion, if we allow the Wabash to have contributed one-half of the entire business of the Toledo station, we find that the total withdrawal of traffic would have reduced the net earnings of the Lake Shore last year just about half a million of dollars, which is just 1 per cent. on the capital stock.

WILLIAM PRESCOTT SMITH, who died on the 1st inst. in Baltimore, having occupied a prominent position as a railroad officer for many years, and being known to the community at large, especially in Baltimore and Washington, more widely than most managers of traffic ever become, is the subject of many very warm eulogies in the Baltimore and Philadelphia papers. In Baltimore, Messrs. David L. Bartlett, Wm. Keyser and Walter S. Wilkinson publish an address, in which they say that it has been represented to them that Mr. Smith left his family (a wife and three children) in circumstances "such as his and their well-wishers could not desire." They propose, therefore, to receive, as trustees, subscriptions, to be invested in United States bonds or Baltimore registered stock, as a memorial fund, the income to be applied to the maintenance and education of Mr. Smith's family, and the fund to be divided eventually among the members of that family as shall seem most appropriate. Subscription papers for this fund are open at the offices of the Baltimore *American*, *Gazette*, and *German Correspondent*, and at the music store of Otto Sutro, No. 189 West Baltimore. The names of the subscribers and the amounts of their subscriptions will not be published.

Mr. Smith was a public-spirited man and prominent in Baltimore society, and the expression is universal that he is a great loss to their city as well as to his profession.

SLOW TRAINS have been the subjects of many witty sayings, and the Memphis & Little Rock Railroad has come in for its share, both for the very moderate speed of its trains and its general condition. The last reporter is Mr. George Alfred Townsend, who writes to the Chicago *Tribune* that to cross the Mississippi bottom, 41 miles, requires six hours, and illustrates by the following incident: "I was a spectator of the extraordinary event of a man falling off the rear-end platform, with a cigar in his mouth, who tumbled down an embankment 20 feet, picked up his cigar, lighted it with a match, and then run on and caught the train with ease."

Next!

A RAILROAD PROBLEM, in which our younger, and perhaps some of our older, readers may be interested, is the following:

If a freight locomotive, capable of running at a maximum speed of 40 miles per hour 40 seconds after it starts, should by accident escape without any one on it, and five minutes after a passenger engine, capable of running 50 miles per hour in 50 seconds from the time the throttle valve is opened, should start in pursuit, how far and how long will they run before one overtakes the other? It is assumed that the speed of the engines is uniformly accelerated from the time they start until they reach their maximum speed, and that the track is level and unobstructed.

THE ANNUAL MEETING OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS will be held on Wednesday, November 6, at its rooms, No. 63 William street, New York, at 10 o'clock a. m., for the election of officers, the hearing of reports and the transaction of other business.

Train Accidents in September.

On the morning of the 2d a train on the Gloucester Branch of the Eastern Railroad was thrown from the track near Gloucester, Mass., by a large stone which had fallen on the track. The engine was badly injured, and the engineman and fireman a very little bruised.

On the 2d track hands on the Delaware Railroad, about 20 miles south of Wilmington, Del., while repairing track removed a rail and neglected to signal trains. A freight train with a passenger car attached passing by, it was thrown from the track, the engine and passenger car were broken up, the track torn up for about a hundred yards, and a brakeman and two others seriously injured.

Very early in the morning of the 3d the tender, smoking car and ladies' coach of a passenger train on the Mobile & Ohio Railroad were thrown from the track two miles south of Clinton, Tenn. No one was hurt, and little damage was done.

On the 3d a freight train was thrown from the track of the Indianapolis, Bloomington & Western Railway near Urbana, Ill., causing considerable delay.

On the evening of the 3d two freight trains on the Toledo, Wabash & Western Railway met in collision near Keller's, Ind., wrecking both engines, dangerously and perhaps fatally injuring an engineman and breaking several ribs of a brakeman. The accident is said to have been caused by the misreading or misunderstanding of his orders by the engineman—an experienced man, who had an excellent reputation.

On the night of the 3d a freight train on the Erie Railway ran through an open switch at Belvidere, N. Y., and the engine went down the bank, injuring the engineman severely and the fireman slightly. The switch had been misplaced by some one who extinguished the switch light and filled the lantern with grass.

At 11 o'clock on the evening of the 5th, on the Lake Erie Division of the Baltimore & Ohio Railroad near Independence, Ohio, there was a collision between a north-bound express train and a south-bound excursion train returning from a fair, which was following close after a mail train. The locomotives and several cars of both trains were wrecked and the two leading cars on both trains were telescoped. About 45 persons, mostly passengers, were injured, ten of them fatally. A correspondent of the Cincinnati *Gazette* gives the following account of the circumstances of the accident:

"Independence is a point at which the northern express and

south-bound mail train, on the Lake Erie Branch of the Baltimore & Ohio Railroad pass each other. The south-bound mail had the track and was closely followed by the excursion train from the fair at Mansfield. The excursion train was loaded to its utmost capacity. Conductor Patrick, in charge of the north-bound express, drew off on side track for the south-bound mail to pass. The latter passed accordingly, and then, it is said, Conductor Patrick received a dispatch from E. M. Livingston, Train Dispatcher at Newark, informing him that the track was clear to Belleville, four miles on the way toward Mansfield, and that he should pull out and run to Belleville. Himself and the engineer debated the question as to whether they should obey the direction contained in this dispatch. They knew the excursion train from the fair was coming, and could not be far away, but they finally, as it proved unfortunately, concluded to obey.

"Scarcely had the express train gone a quarter of a mile on the curve that concealed the track than the excursion train came in view. All efforts to stop the trains were useless, and they collided with fearful force."

A telegram announcing that the coroner's jury had rendered a verdict charging the responsibility for the accident on Mr. Livingston, the Supervisor of Trains, says that the company is disposed, instead, to blame the conductor of the north-bound express.

A correspondent of the Ohio *State Journal*, who was on the wrecked excursion train, says that the preceding train (the regular mail), which the north-bound express passed at Independence, carried the two flags, which are the regular signal that an express is following with the same right to the road, which should have given the trainmen of the north-bound train due notice.

Early in the morning of the 6th, as a double freight train on the New York Central & Hudson River Railroad was running eastward, near Schenectady, a dense fog prevailing at the time, the forward train broke in two, and the rear train, its engineman not being able to see the signal lights, ran into it, crushing the caboose to atoms and breaking into the cars ahead, four of which were loaded with petroleum. These caught fire, and they, with the engine of the rear train and two cars of merchandise ahead of the oil cars, were destroyed by fire. The engineman of the rear train and the conductor of the forward train were badly hurt, but not dangerously.

On the 6th two freight trains on the Pennsylvania Railroad came into collision at Blairsville Intersection, Pa., wrecking a number of cars, cutting off a fireman's arm and killing an engineman.

On the 6th, from some unexplained cause, the freight car next the engine on a train running on the Erie Railway from Paterson, N. J., to New York, caught fire, and a quantity of silk goods and other valuable freight was ruined before the fire was put out, which was done with water from the tender.

On the evening of the 6th an engine going west for repairs on the Jacksonville, Pensacola & Mobile Railroad came into collision with an east-bound passenger train which was standing on the track at Goodman's Station, Fla., slightly injuring the fireman of the moving engine and damaging both engines considerably. It is said that the engineman of the west-bound train was asleep.

On the morning of the 8th, as an express train was running about 40 miles an hour on the New York Central & Hudson River Railroad through Carthage Landing, a wheel under one of the Pullman sleeping cars described in a telegram as "one of the new style of wooden wheels," was broken in pieces. The other five wheels of the six-wheeled truck, however, supported the end of the car perfectly, and the car was drawn in this condition for four miles, without leaving the track, when it was switched off.

On the morning of the 8th there was a collision between a freight train and the Kalamazoo accommodation on the Michigan Central Railroad near Buchanan, Mich. The conductor of the freight train, it is reported, arrived at Buchanan under orders to run to Niles by 6:35 a. m., but at Buchanan received further orders instructing him to remain at Buchanan. The latter he disobeyed, and ordered his train forward, and only when a mile beyond Buchanan showed the new order to the engineman, who immediately commenced backing, but too late to avoid collision, which caused severe injuries to the engineman and baggageman of the accommodation. The freight conductor was arrested.

On the 8th a freight train of the Toledo, Peoria & Warsaw Railway ran through the end of a side-track at Keokuk, Iowa, the grade being steep, the track heavy and no sufficient obstruction being placed at the end of the track.

On the afternoon of the 8th the caboose of a freight train on the Jackson, Lansing & Saginaw Division of the Michigan Central Railroad was thrown from the track, and the people in it pretty well shaken up, near Swan Creek, Mich. No one was much hurt.

About 2 o'clock on the morning of the 9th, near Avon Station, on the Chicago, Burlington & Quincy Railroad, an extra freight train running south broke in two, leaving the caboose and one car in the way of a regular freight that was a short distance in the rear. A flagman was sent back too late to stop the approaching train, which came into collision with the two cars, almost entirely destroying them, wrecking the locomotive and blocking the road nearly eight hours. No one was injured.

On the 9th, about 6 o'clock in the morning, a freight train met in collision a stock train on the Pacific Railroad of Missouri, about 38 miles beyond St. Louis. Both engines were nearly ruined, eight cars were broken up and about 40 cattle were killed. The accident is said to have been caused by the misreading of the time-table by the conductor of the stock train. hours.

On the afternoon of the 9th six cars of a freight train on the Indianapolis & St. Louis Railroad were ditched at Embarrass Siding, Ill., the cause, it is reported, being the breaking of an axle.

On the afternoon of the 9th, a broken axle caused the wrecking of eight or ten cars of a freight train on the Indianapolis & St. Louis Railroad near Spray, Ind., causing considerable delay of trains.

On the 9th a passenger train leaving Chicago on the Chicago, Burlington & Quincy Railroad, about 10 p. m., got engine, tender and forward trucks of baggage car off a switch near State street, which resulted in a delay of two or three hours and some slight damage to trucks of engine.

On the night of the 9th, about 2½ miles west of Peru, Ind., on the Toledo, Wabash & Western Railway, a detached locomotive came into collision with a freight train, doing considerable damage and blocking the road some hours, but hurting no one.

About 4 o'clock on the morning of the 10th, two freight trains on the New York Central & Hudson River Railroad moving in opposite directions met in collision about three miles east of Albion, N. Y., wrecking both engines and six cars, and causing a fire which burned two cars. No one was hurt. The east-bound train was late at Albion, and the conductor of the west-bound train concluded that it had stopped at the next station and so went on. Whether the telegraph was used or not and what the rules were do not appear.

On the afternoon of the 10th, an east-bound fast train on the Pennsylvania Railroad was turned from the main track near Middletown, Pa., by a misplaced switch, and ran through an engine house, wrecking the cars, and injuring five persons, none dangerously. The train was behind time and the switch had been turned for a west-bound train. The Harrisburg *State Journal*, describing the accident, says: "After running the length of a rail over the ties, the entire train jumped on the track that leads to the engine house where the locomotive used by the supervision of the section is kept at night. This track, three hundred feet long, was soon passed over, when the train ran into the engine house, the locomotive knocking the other locomotive out at the back end, breaking down the carpenter shop beyond and partially demolishing the engine house. The express car immediately following the locomotive, shot upward, the forward end extending eight or ten feet above the engine house. The baggage car, next following, was partially broken up as well as the first passenger car, while the bumpers of the other passenger cars were more or less jarred."

On the evening of the 10th two freight trains on the Toledo, Wabash & Western Railway met in collision near Logansport, Ind., wrecking the engines completely and throwing several cars down the bank. Five men were injured.

On the evening of the 10th two flat cars ran off the track of a turn-out on the Amboy Division of the Pennsylvania Railroad at Florence, N. J., in front of a passenger train bound to New York. The engine was badly wrecked, and the front platforms of the baggage car and the smoking car were crushed. The fireman, who remained on the engine, was unhurt; the engineman, who jumped, was severely bruised.

On the morning of the 11th a train on the Flushing & North Side Railroad, of Long Island, ran through a switch, carelessly left misplaced by the tender, and into some passenger cars which were housed in a shed. The engine was somewhat damaged, and two of the housed cars pretty badly. No one was hurt.

On the 11th, as a milk train was entering Middletown, N. Y., on the New York & Oswego Midland Railroad, being two hours late, it was turned into a switch which had carelessly been left open. A number of freight cars were standing on the switch, one of which was badly shattered, while the others had their bumpers broken and were otherwise injured, and the engine of the milk train and the milk cars were considerably damaged. The engineman, fireman and a brakeman were slightly hurt.

On the night of the 11th, as a freight train on the New York Central & Hudson River Railroad was going up a steep grade in West Albany, four platform cars in the rear broke loose, ran back toward the depot at a fast rate, and over a turned switch to a side track till they encountered three cars loaded with pig iron, which threw them all off the track and damaged them badly.

On the 12th a passenger train on the Indianapolis & St. Louis Railroad ran off the track at Litchfield, Ill., doing considerable damage to rolling stock, but hurting no one.

On the 12th freight trains of the Peoria & Rock Island and the Chicago, Rock Island & Pacific railroads came into collision in Peoria, Ill. Both locomotives and several cars were broken up, but no one was hurt.

On the evening of the 12th a long train consisting of a locomotive and eleven cars was thrown from the track of the Jacksonville, Pensacola & Mobile Railroad near White House, Fla., by a bull which was lying on the track, badly wrecking the cars.

On the night of the 12th, on the Michigan Central Railroad at Trumbull's side-track, there was a collision between a west-bound express train and an east-bound special train from the fair at Kalamazoo. The latter was standing on the main track waiting for the express to go on the siding, but for some reason the engineman of the express understood that the special train was to be on the siding, and his to pass on the main track, and so struck the special with some violence. Both engines and the baggage cars were considerably damaged, and some passenger cars slightly. Three trainmen were somewhat hurt.

On the 13th the engine, tender and eight or ten loaded coal cars of a train on the Syracuse & Binghamton Division of the Delaware, Lackawanna & Western Railroad were thrown from the track by the spreading of the rails near Syracuse. No one was hurt.

On the evening of the 13th a rail fastened to rotten ties, on the spur of the Marietta & Cincinnati Railroad leading to Marietta, was pushed to one side under a heavily laden car of a mixed train, and this car, loaded with hogs, rolled down the hill, dragging after it for a few feet the end of a passenger car behind it. No one was hurt.

On the night of the 13th, on the Chicago & Alton Railroad at Delavan, Ill., four carloads of cattle were thrown from the track, killing 15 or 20.

On the night of the 13th an express train on the Gilman, Clinton & Springfield Railroad encountered a herd of cattle which had suddenly jumped upon the track near Mount Pulaski, Ill. The immediate reversing of the engine and application of the air brakes brought the train to a halt in a very short distance, but not soon enough to save the engine and baggage car from being thrown from the track. No one was hurt.

On the 16th a north-bound passenger train on the Chicago, Burlington & Quincy Railroad left the track at a split switch near Keokuk Junction, Iowa. The engine, forward trucks of baggage car and sleeping car remained on the track. The rest of the train came down upon the ties, creating a general panic among the passengers but injuring none. A delay of ten hours and some broken truck timbers were the principal results.

On the afternoon of the 17th a train of the Chicago, Rock Island & Pacific Railroad backed into a train of the Burlington, Cedar Rapids & Minnesota Railroad at West Liberty, Iowa, throwing three or four cars from the track. A brakeman had his leg broken in jumping from the train.

On the night of the 17th, owing to the misplacement of a switch, believed to have been malicious, an engine and two cars were thrown from the track of the Des Moines Valley Railroad near the round-house in Keokuk, Iowa, and the locomotive was utterly wrecked and the engineman badly hurt.

On the night of the 17th a locomotive jumped a switch in the yard of the Columbus, Chicago & Indiana Central Railway at Columbus, Ohio, and landed with one end in the ditch, the other remaining on the track. While a gang of men were working to replace this engine, a freight train, in consequence, it is believed, of the malicious opening of the switch, ran down the switch and upon the wreck, sending it several yards further down the switch, wrecking three cars and badly injuring a man who was working on the engine.

On the morning of the 18th several cars broke loose from a freight train on the Baltimore & Ohio Railroad as it was ascending a heavy grade above Cranberry Summit, W. Va., and ran back with frightful speed until they struck a mail train, damaging the engine and several cars of the latter, as well as the remaining cars. A brakeman on the mail train had a leg broken.

On the 18th an engine hauling a coal train on the Cumberland & Pennsylvania Railroad was thrown from the track in the Narrows by the breaking of a tire. No one was hurt and no serious damage was done.

On the 18th an east-bound freight train on the Jacksonville, Pensacola & Mobile Railroad ran off the track at Lake City, Fla., blocking the track 12 hours or more.

On the 19th a passenger train going north on the Keokuk Branch of the Chicago, Burlington & Quincy Railroad ran off, about daylight, near Keokuk Junction, leaving the track at a frog. The engine and baggage car came down upon the ground, disabling the engine so that it could not proceed and delaying the train two or three hours.

On the 19th, on the Keokuk Branch of the Chicago, Burlington & Quincy Railroad, a south-bound passenger train was thrown from the track near Keokuk Junction, about midday, by a broken brake connection. This was the third derailment which had occurred within four days at nearly the same spot.

On the afternoon of the 19th, as a passenger train on the Boston & Maine Railroad was approaching the station at Lawrence, Mass., a smoking-car and a passenger car following it left the track, and the smoking-car went down the embankment and was turned completely over, while the front end only of the following car went down. The former was badly shattered, and two persons in it injured. The Boston *Advertiser* describing it says:

"It is thought that the cars jumped the track at a point where the rails are connected with what is termed a 'spring frog.' The engine passed over this. The baggage-car, which was next, went off, and the engineer feeling the jerk, looked behind him and saw what had occurred. He immediately applied the brakes. The rails are close to the edge of the embankment at this point, and before the cars could be stopped, the smoking-car went over with a crash, carrying the car behind along with it."

On the afternoon of the 19th, the Washington express train on the New York Division of the Pennsylvania Railroad ran into a gravel train as it was backing into a siding between Elizabeth and South Elizabeth, N. J., striking it at about the center of its length. The engine and three cars of the express were wrecked, and there was a block for two or three hours, but no one was hurt.

On the 20th a passenger train on the Jacksonville, Pensacola & Mobile Railroad ran off the track at Lake City, Fla.

On the 21st, as two freight trains were climbing the "Seventeen-mile Grade" on the Baltimore & Ohio Railroad above Piedmont, W. Va., several gondola cars loaded with railroad iron in the rear of the forward train broke loose and ran back upon the rear train, wrecking the engine and several cars, and injuring the engineman and fireman.

On the 21st, the engine of a construction train on the Lake Erie Division of the Baltimore & Ohio Railroad, ran off the, track near Mount Vernon, Ohio, and rolled completely over scalding the fireman severely, and the engineman probably fatally.

On the 21st, about 8 p. m., the passenger car, baggage car and a box car of a mixed train on the Quincy, Missouri & Pacific Railroad, left the track about twelve miles east of Kirksville, Mo., near a small bridge over a ravine into which some of the trucks dropped. This is the first noticeable accident on this new road, though there has been a great deal of wet weather since it was first put in operation.

On the morning of the 21st, as a freight train on the Toledo, Peoria & Warsaw Railway was approaching the bridge over the Illinois in Peoria, the engineman neglected to stop his train 200 feet in front of the bridge and wait for a signal that the draw was closed, as the rules of the road positively direct, but kept on until within 50 yards of the bridge, he saw that the draw was open. Then he opened his sand-box and reversed

his engine; but the engine, tender and two cars went through the draw and were badly wrecked. No one was hurt.

On the evening of the 21st, as a west-bound excursion train on the Southern Minnesota Railroad was running about six miles an hour near Whalem, Minn., the rear car, which was filled with passengers, mounted the rails and went down the bank. Two passengers were considerably hurt. The accident is mentioned as the first that has happened on the road.

Very early on the morning of the 23d a freight train of Union Line cars ran into a freight train which was pulling out of a siding to the main track at Lawrence, N. J., where it had just put in to clear the road for another train which had just passed. The engine and four cars were on the main track, and these cars the other engine ran through, and was itself considerably damaged.

On the afternoon of the 23d, on the Oregon & California Railroad, about seven miles from Oakland, Oregon, there was a collision between a north-bound freight train and a construction train which was backing southward at the time. The collision occurred at a place where there is the steepest grade and the sharpest curve on the road; the rails were wet and it was found impossible to stop the trains after they came in sight of each other and before they met. Four Chinamen on the construction train were killed.

On the night of the 23d a freight train on the Lake Superior & Mississippi Railroad ran into a herd of cattle two miles south of Moose Lake, Minn., and, in the language of a newspaper report, "scattered beef all over seven acres." A number of cars were thrown from the track, and the road was blocked some hours, but no one was hurt.

On the morning of the 25th the engine of an accommodation train on the Indianapolis, Cincinnati & Lafayette Railroad struck a hog near North Bend, Ohio, by which the cow-catcher was so bent down that it struck the ties and finally caught under one, throwing engine, tender and baggage car from the track and on their sides. The engineman and fireman were severely injured.

On the 25th a west-bound freight train on the Marietta & Cincinnati Railroad went through a trestle-bridge two miles west of Vincent Station, Ohio. The conductor and a brakeman were instantly killed, the engineman and fireman dangerously hurt. There was some oil on the cars, and this caught fire, and some cars and a part of the trestle work were destroyed.

On the afternoon of the 25th, as a train on the Flushing & North Side Railroad was about starting out of Whitestone, L. I., the boiler of the locomotive exploded, throwing engineman and fireman about 20 feet, but injuring no one. Low water is reported as the probable cause. The engineman had but recently come on this road, but had served before on the Boston & Providence Railroad.

On the morning of the 25th one of the cars of a freight train on the Erie Railway was thrown from the track by a broken beam, and, not being observed, was dragged about a quarter of a mile to the bridge over the Delaware at Port Jervis. On the bridge the car turned to one side and knocked down the side of the bridge, and nearly fell into the river, being held by rods against its end. The explanation given of the cars not being seen for so long is that a heavy rain falling at the time had driven every one under shelter.

On the morning of the 26th the engine and one car of a freight train on the Lake Shore & Michigan Southern Railway ran off the track near Whiting's Station, Ill. The engine tipped over into the ditch and was badly damaged. The fireman was slightly hurt.

On the morning of the 26th, as a heavy train of Boston & Albany freight cars was ascending the mountain near Washington, Mass., nineteen cars broke from the train and began running backward. The brakeman ran to the last car and put on the brakes, when eight of the cars farthest from him broke loose and went thundering down the grade to Chester, where they struck some other freight cars, reducing three of them to splinters.

On the night of the 26th three cars, including one sleeping car, of an express train on the Wilmington & Weldon Railroad ran off the track between Everettsville and Dudley, N. C. The ladies' car went down an embankment and turned upside down; the sleeping car fell over trestle work down twenty feet to the bed of a stream. Four passengers were considerably hurt, but none dangerously.

On the morning of the 27th, "through misconstruction of a train order," two freight trains on the Cleveland, Columbus, Cincinnati & Indianapolis Railroad met in collision at Chesterfield, Ind., killing an engineman and wounding two firemen. The trains were going at full speed when discovered, and though both engines were reversed and brakes called on both trains, the shock was tremendous and the locomotives were nearly ruined and many of the cars wrecked.

On the morning of the 27th six cars filled with passengers of a south-bound express train on the New York Central & Hudson River Railroad ran off the track near Yonkers, New York; but none of them turned over, and no one was hurt. The spreading of the rails is assigned as the cause.

On the 27th a defective rail on the Louisville & Nashville Railroad, six miles from Nashville, caused some of the cars of a freight train to leave the track, and fourteen cars were jammed into a deep cut and eleven of them were crushed to fragments.

On the morning of the 28th a south-bound express train on the Peoria, Pekin & Jacksonville Railroad ran into four stock cars which had been blown from a switch to the main track near Jacksonville, Ill. Two cars were destroyed and the engine thrown from the track and badly injured. No one was hurt.

On the night of the 28th a north-bound express train on the Boston, Concord & Montreal Railroad ran over three cows three miles below Lancaster, N. H., throwing it from the track and badly wrecking it. There were only nine passengers on board, none of whom were seriously hurt. A brakeman and a station agent were severely and a conductor slightly hurt.

On the morning of the 29th a work-train on the Boonton Branch of the Morris & Essex Railroad met in collision a coal train near the High Bridge west of Llewellyn Park, N. J. The cars of the work-train were thrown from the track, two men were killed and eight seriously injured.

On the morning of the 30th as a Yonkers train was passing Eighty-sixth street, New York, on the New York Central & Hudson River Railroad, the boiler of the locomotive exploded, scalding the engineman slightly.

This is a total of 70 accidents within the month, which we classify as to their nature or causes as follows:

Derailments.		
	Unexplained	16
	By cattle	5
	By misplaced switches	3
	By spreading of rails	3
	By broken axles	2
	By open draw	1
	By broken beam	1
	By defective rail	1
	By fallen rock	1
	By rail removed for repairs	1
	By running through switch	1
	By breaking train in two	1
	By broken tire	1—37
Collisions.		
	Head collisions	13
	Rear collisions	11
	Unexplained	3
	Crossing collision	1—28
Boiler explosions		2
Broken bridge		1
Fire		1
Broken car wheel		1
Total		70

These seventy train accidents caused the death of 22 and the more or less severe injury of 100 persons. By the collisions 19 were killed and 69 injured, 18 being killed and 60 injured by the head collisions alone. In the 37 derailments one person was killed and 28 injured, and in 24 out of the 37 of these accidents no one was hurt. The other two persons killed lost their lives by the breaking of a bridge, by which also two of the other three wounded persons were hurt, the other suffering from a boiler explosion.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—At the annual meeting of the Toledo, Wabash & Western Railway Company, held in Toledo, October 2, the following were chosen directors by a unanimous vote of the stock voted: Azariah Boody, Daniel Drew, A. M. White, A. B. Baylis, Isaac H. Knox, Horace F. Clark, Augustus Schell, Sidney Dillon, David Dows, John Ross and Kenyon Cox, New York; George Cecil, Logansport, Ind.; Milton Courtright, Erie, Pa.; J. S. Casement, Ohio; John F. Tracy, Chicago. Of these, Messrs. Courtright, Dillon, Drew, Ross and Tracy are directors of the Canada Southern Company and are a majority of its board of nine, though only one-third of the Wabash board; so it might be more correct to say that the Wabash will control the Canada Southern than that the Canada Southern will control the Wabash. Messrs. Boody, Clark and Schell are Lake Shore & Michigan Southern, and Clark and Schell New York Central & Hudson River directors. Tracy, Dows and Courtright are in the Chicago, Rock Island & Pacific board; the same and also Baylis in the Chicago & Northwestern. The new members in this board are Messrs. Courtright, Cox, Casement, Dillon, Dows, Drew, Ross and Tracy, and of these all but Casement and Cox are directors of the Canada Southern, and they are supposed to be interested in it, Casement being President of the company which is to construct the road to Toledo. They take the places of Messrs. H. B. Payne and Amasa Stone, Jr., of Cleveland, and James H. Banker, of New York (Lake Shore directors); and of William Kidd, R. J. Capron, S. B. Chittenden and Sheppard Gandy, of New York.

The officers were all re-elected, viz.: Azariah Boody, New York, President; J. N. Drummond, Toledo, Assistant President; A. Anderson, Toledo, Vice-President; George H. Burrows, Toledo, General Superintendent; William B. Corneau, Toledo, Secretary and Treasurer.

—Mr. George R. Blanchard, long General Freight Agent of the Baltimore & Ohio Railroad, has been appointed General Freight Agent of the Erie Railway in place of B. W. Blanchard, who resigned a few months ago.

—S. H. Dunan, Auditor of the Baltimore & Ohio Railroad, has been appointed Auditor of the Erie Railway in place of G. P. Morosini, resigned.

—Mr. John T. Wilson has been appointed Master Mechanic of the Southern Pacific Railroad of California. Mr. Wilson has been in railroad service, as engineman, foreman or master mechanic, since 1852. In 1862 and '63 he was Master Mechanic in the Clinton shops of the Chicago & Northwestern; Master Mechanic of the Utah Division of the Union Pacific in 1869 and '70; and afterwards of the Humboldt Division of the Central Pacific, whence he goes to the Southern Pacific.

—Thomas J. Brown, late Superintendent of the Fourth avenue horse railroad, has been appointed General Manager of the Pavonia Perry, the Pavonia horse railroad, the Erie baggage express, transfer coaches, and of all horses, stables, carriages and carriage houses of the Erie Railway in New York and Jersey City.

—Mr. John Cleghorn, a director of the Northeastern Railway Company of England, has been chosen a director of the Great Western of Canada, in place of Morris K. Jesup, of New York, resigned.

—Mr. George S. Reddington, recently promoted to be Superintendent of the Eastern and Delaware divisions of the Erie Railway, was formerly a resident of Milwaukee, and a conductor on the Milwaukee & Prairie du Chien Railroad.

—Mr. William Prescott Smith, formerly Master of Transportation of the Baltimore & Ohio Railroad, afterward, for several years and until very lately, General Manager of the New York & Washington Air Line (the through passenger route maintained by way of the New Jersey Railroad, the Philadelphia, Wilmington & Baltimore, and the Washington Branch of the Baltimore & Ohio), and again for a few weeks Master of Transportation of the Baltimore & Ohio, died in Baltimore, on the evening of the 1st inst., of hæmorrhage of the bowels. Mr. Smith was very widely known outside of railroad circles, having a dignified presence, imposing manners, a social nature and readiness in conversation and public speaking.

—At a meeting of the stockholders of the Cincinnati & Great Northern Railroad Company, held at Cincinnati, September 30, James T. Brady, of Pittsburgh, W. A. Weston, J. C. McKeemy, Davis Johnson, A. S. Latta, F. C. Le Blond, John C. Fremont, H. Van Tilburgh, A. J. Hodder, S. R. Stimpson and T. Turpen were elected directors for the ensuing year.

—At the annual meeting of the South Mountain Railroad Company, at Jonestown, Pa., September 24, the following board of directors was elected: J. A. Beiteman, C. M. Schomo, M. Richard, Fred. Harner, M. Miller, H. Brobst, B. Klein, Jacob W. Grove, Simon Heilman, Thomas Lesher, Robert Bland, W. C. Smith.

—At the annual meeting of the Valley Railroad Company of Virginia, at Winchester, Va., September 25, Robert Garrett, of Baltimore, was re-elected President of the company, and Johns Hopkins, Wm. Keyser, P. P. Pendleton, R. T. Baldwin, D. H. Miller and R. Norris, Jr., of Baltimore; Edmund Pendleton, of Botetourt, Va.; M. G. Harman, of Staunton; Wm. Allen, of Rockbridge, and George W. Hansbrough, of Roanoke, were elected directors.

—At a meeting of the stockholders of the Buffalo, New York & Philadelphia Railroad Company, held at Buffalo, October 2, the following board of directors was elected: Thomas Clark, James Brayley, Myron P. Bush, Cyrus Clarke, Henry A. Richmond, J. F. Schoellkopf, C. J. Hamlin, Sherman S. Jewett, Bronson C. Rumsey, Jonathan Scovill, Walter Cary, William G. Fargo, of Buffalo, and A. M. Benton, of Port Allegheny, Pa. At a meeting of the board of directors, held October 3, Bronson C. Rumsey was chosen President, Henry A. Richmond, Vice-President, and H. L. Lyman, Secretary and Treasurer. These are all re-elections.

—Mr. William T. Thelin has been appointed Auditor of the Baltimore & Ohio Railroad Company, in place of Mr. S. H. Dunan, who recently resigned, to accept a position on the Erie Railway.

—Mr. John H. Hull has been appointed Assistant Superintendent of the West Wisconsin Railway, with headquarters at Hudson, Wisconsin.

—The officers of the Mobile & Montgomery Railroad are: Charles T. Pollard, President; L. M. Wilson, Vice-President; G. Jordan, Engineer and General Superintendent; C. P. Ball, Assistant Superintendent; John J. Beasley, Secretary and Treasurer; John S. Pollard, Auditor and Ticket Agent; James McFarland, Master Machinist; Lewis Barham, Master Carpenter.

—Mr. W. M. Johnson, late an engineer on the St. Joseph & Denver City Railroad, has accepted a position on the Texas & Pacific, and is now stationed at Dallas, Texas, in charge of the work on the bridge over the Trinity, the 5,000 feet of trestling in the bottom, and the depot grounds in Dallas.

—The National Railway Publication Company has chosen Mr. A. A. Barnes as editor of the *Official Railway Guide*, and Mr. W. F. Allen as assistant. Mr. Barnes has been for some years General Ticket Agent of the Memphis & Charleston Railroad, but has had a varied experience in professional life, and is said to be a man of much culture and ability. Mr. Allen has been heretofore an engineer on the West Jersey Railroad.

—Mr. A. S. Dungan, formerly Southeastern Agent of the Little Miami Railroad, has been appointed General New York Passenger Agent of the Ohio & Mississippi Railroad, with office at No. 241 Broadway.

—N. Shelton has been appointed Cashier of the Union Pacific Railroad, to take the place of Charles A. Gillespie, Local Treasurer, who has resigned.

—W. S. Sneden has been appointed Superintendent and Engineer of the New Jersey Southern Railroad, to succeed Thos. R. Sharp, who is now Assistant Master of Transportation of the Baltimore & Ohio Railroad.

—Charles P. McFaddin has been appointed General Ticket Agent of the New Jersey Southern Railroad, with office at Long Branch.

MISCELLANEOUS.

—The workmen on the Mount Washington railroad have been in the habit of going down the mountain by sliding down on a board attached to the rails, on which they sometimes made a very rapid descent. A Frenchman started down in this way, the other day, while the mountain was enveloped in a heavy mist, and while going at a high rate of speed, dashed into an ascending locomotive and was instantly killed.

—A Boston watchmaker forgot to get a ticket in going from Wollaston to Boston on the Old Colony Railroad on Sunday, and refused to pay the ten cents additional fare which is charged passengers who pay on the cars. The company complained of him for evasion, and the Municipal Court fined him five dollars. On appealing to the Superior Criminal Court, on the plea that he was traveling for pleasure and that carrying such passengers was a violation of law of the Commonwealth, the Court directed that a verdict of not guilty be rendered without passing on the question of the legality of the extra charge.

—In a recent case at Chicago, a man who had lost his leg by being struck by a locomotive while crossing a side track of the Chicago & Northwestern Railway in Chicago recovered the sum of $3,500 as damages. The fault of the company charged was negligence in not having the bell of the locomotive rung. As to this fact, however, the testimony was conflicting; but the jury, as juries are apt to, believed the testimony for the complainant rather than that for the company.

PERSONAL.

—Mr. H. P. Nicholls, of Worcester, has refused an appointment as Superintendent of the Eastern Division of the Boston & Albany Railroad, and it is reported that Mr. D. W. Lincoln, Vice-President of the company, will discharge the duties of the position for the present.

—General William Mahone, President of the Atlantic, Mississippi & Ohio Railroad Company, was made the father of three children at one birth recently.

TRAFFIC AND EARNINGS.

—The earnings of the Atlantic & Great Western Railroad for the month of September were: 1872, $505,069; 1871, $381,386; increase, $118,683, or 30⅔ per cent.

—The following is a tabular statement of the earnings of most of the railroads of the Dominion of Canada for month of July:

	Total 1872.	Total 1871.	Miles 1872.	Miles 1871.
Great Western	$391,907	$347,592	351½	351½
Grand Trunk	668,475	621,806	1,377	1,377
London & Port Stanley	7,975	5,919	24½	24½
*Northern	39,568	36,805	97	97
Midland of Canada	37,909	39,063	80	80
St. Lawrence & Ottawa	14,854	10,660	54	54
St. Lawrence & Industry	1,344	1,151	...	...
European & N. American	33,920	29,164	108	108
Nova Scotia	†37,304	32,514	145	145
Total	$1,233,946	$1,124,674	2,246	2,246

* For two weeks. † Including W. Branch, $9,278.

All of these lines, except the Canada Midland, show an increase in earnings, there being no change in mileage. The

average per mile for the month is $549 in 1872 and $500 in 1871. The Great Western is earning above the average, with $1,112 per mile in 1872; the Grand Trunk considerably below, with $485 per mile.

—The earnings of the Chicago & Alton Railroad for the month of September were: 1872, $409,062; 1871, $507,616; decrease, $98,554, or 24½ per cent.

—The earnings of the St. Louis, Kansas City & Northern Railway for the month of September were: 1872, $280,384; 1871, $287,697; decrease, $7,313, or 2½ per cent.

—The earnings of the Central Pacific Railroad for the month of September were: 1872, $1,332,220; 1871, $995,921; increase, $336,299, or 33¾ per cent.

—The earnings of the Ohio & Mississippi Railway for th month of September were: 1872, $356,232; 1871, $321,352; increase, $34,880, or 10⅞ per cent.

—The earnings of the Illinois Central Railroad for the month of September were: 1872, $759,967; 1871, $890,287; decrease, $130,320, or 14⅔ per cent.

—The earnings of the Lake Shore & Michigan Southern Railway for the third week in September were: 1872, $382,208; 1871, $302,371; increase, $79,837, or 26⅓ per cent.

—The earnings of the Kansas Pacific Railway for the third week in September were, from passengers, $27,694.45; freight, $51, 752.28; mails, $2,055.31; total, $81,502.04. Of this amount $4,460.45 was for transportation of mails, troops and government freight.

—The earnings of the Marietta & Cincinnati Railroad for the month of September were: 1872, $191,841; 1871, $166,191; increase, $25,650, or 15½ per cent.

—The earnings of the Toledo, Peoria & Warsaw Railway for the month of September were: 1872, $114,487; 1871, $104,544; increase, $9,942, or 9½ per cent.

—The earnings of the St. Louis & Iron Mountain Railroad for the third week in September were: 1872, $53,270; 1871, $37,016; increase, $16,254, or 44 per cent.

—The earnings of the St. Louis & Southeastern Railway (consolidated) for the third week in September were $25,700, being an increase of $500 over the corresponding week in August.

—The earnings of the Great Western Railway of Canada for the week ending September 13 were: 1872, £23,618; 1871, £21,093; increase, £2,525, or 12 per cent.

—The earnings of the Grand Trunk Railway for the week ending September 14 were: 1872, £41,300; 1871, £36,400; increase, £4,900, or 13½ per cent.

OLD AND NEW ROADS.

Malone & Plattsburg.

A railroad is proposed, to run from Malone, N. Y., east by way of State Dam, Chateaugay Lake and Dannemora, to Plattsburg on Lake Champlain, a distance of about 45 miles.

Vermont Valley.

The stockholders of this company, whose road (from Brattleborough, Vt., to Bellows Falls) is now leased by the Vermont Central, propose to give their road an independent outlet, by building a line from Brattleborough to South Vernon, about seven miles long. At South Vernon connection will be made with the Connecticut River Railroad.

Portland & Oxford Central.

The State Railroad Commissioners of Maine recently asked the Supreme Court for an injunction to stop the running of trains over this road, on account of the unsafe condition of the road. The court, instead of granting an injunction, issued an order requiring the company to put the road in proper repair before September 1.

Virginia & Truckee.

Regular passenger trains commenced running between Reno and Virginia City October 1. A large freight depot is to be erected in Virginia City at once.

Atchison Bridge.

General Wright, Chief Engineer, visited Atchison, Kan., October 5, on business connected with the bridge, and reported that work will be commenced during the present month.

Wisconsin Central.

The offices of this company are to be removed to Milwaukee. Its depot will be in connection with the Northwestern Union road.

Atchison & Solomon Valley.

This newly incorporated Kansas Company intends to build a road from Waterville, the terminus of the Central Branch Railroad through Marshall, Washington, Cloud and Mitchell counties to Cawker City, a distance of about 100 miles. The capital is to be $2,000,000, and the incorporators are W. F. Downs, S. C. Pomeroy and some parties from Boston and New York.

Chicago, Dubuque & Minnesota.

The track is completed to Brownsville, Minnesota, 14 miles from the State line and four miles beyond the late terminus at Sumner.

Texas & Pacific.

The Galveston (Texas) *News* says that the California & Texas Railway Construction Company, the company which is constructing the Texas & Pacific Railway, is making arrangements to draw a large portion of its supplies from Galveston.

Iowa, Minnesota & North Pacific.

A petition in bankruptcy has been filed against this company.

Philadelphia & Reading.

At the meeting of the board of directors held in Philadelphia, October 2, the President was authorized to remove the machine shops, foundry and rolling-mill from Reading, if he thought it advisable. This action was probably taken in consequence of the action of the City Council of Reading in causing the removal of the tracks recently laid by the company in Front street, Reading.

Rutland & Champlain.

Surveys are being made for a railroad from Rutland, Vt., to a point on the Champlain Canal. The line runs through Castleton, Hydeville and Fairhaven, and Whitehall will probably be the western terminus. The road will be parallel and close to the Rutland & Washington road, the line surveyed being just north of that road for the whole distance.

Kentucky & Great Eastern.

A meeting of the stockholders of this company was to be held October 9, at the Astor House, New York, for the purpose of electing a board of directors.

Chesapeake & Ohio.

The Richmond (Va.) *Despatch* says that the track is now laid 35 miles west of the White Sulphur Springs and 262 miles from Richmond. Work on the section of 70 miles from that point to Gauley, the present terminus of the Western Division, is being pushed forward rapidly. There are two tunnels not quite completed and some heavy rock-cutting, on which an extra force has been placed. The work has been somewhat retarded by slides caused by the heavy rains, but it is hoped that trains will be running through to the Ohio River this year. On the Western Division 100 miles, from Huntington to Gauley, is completed and in operation.

Missouri, Kansas & Texas.

This company has now a part of its force at work on the south side of Red River, besides the party which is building the bridge over that river. It is said that as soon as the connection with the Houston & Texas Central is complete, a branch will be commenced to connect with the Houston & Great Northern Railroad at Palestine.

Columbus & Toledo.

The sum of $20,000 called for from Perry township, in Franklin County, Ohio, has been raised by individual subscriptions, and no township bonds will be issued.

Lake Erie & Elyria.

This company filed its certificate of incorporation with the Secretary of State of Ohio, October 2. The road is to run from Elyria, O., to Black River. The capital stock is to be $150,000, and the corporators are: Russell H. Penfield, Wm. H. Root, Horace Penfield, C. W. Johnston and Charles G. Finey. The Lake Shore & Tuscarawas Valley Railroad Company has lately completed a line between these points.

Mobile & Montgomery.

The annual report of the Superintendent of this road, Mr. G. Jordan, gives the following statement of the business of the road:

"During the last fiscal year the road received the following sums of money: From freights, $369,219.41; from passengers, $257,482.84; from express, $22,236.82, and from mail, $18,600; total from all sources, $667,539.02. The total operating expenses were $517,414.81, of which the chief items were for conducting transportation, $216,961.42; for maintenance of motive power, $121,982; for maintenance of way, $144,526.86. The net receipts were $150,124.26.

"The increase of receipts over the year before was $28,280.03. An increase of $35,126.84 was realized from passengers, but freights, in consequence of the short cotton crops, fell off $7,650. In 1871 the road carried 65,420 bales of cotton. Last year it carried only 59,675, of which latter amount 38,658 bales were from Montgomery—equivalent to about 71 per cent. of the total receipts at this port.

"The expenses were $23,121, larger last year than they were the year before—from which it will be seen that the increase of receipts, mainly due to the running of double daily trains, more than keeps pace with the increase of expenditures consequent upon the same arrangement.

"The Superintendent further reports (1) that the road-bed is steadily improving; (2) that the track is also being renovated, and fish-plate rails are being substituted for the old-fashioned affairs; (3) that 5,120 feet of trestling has been built, and about 2,700 feet repaired; (4) that the bridge repairs consumed about 727,195 feet, board measure, of lumber; (5) that four new water tanks and ten new division houses have been constructed; (6) that the company has built two and purchased an equal number of cars; (7) that the engineering expenses of the Tensas bridges cost $990,000 instead of $980,000, as had been estimated, and (8) that the ratio of increase of receipts since the opening of the road to Mobile gives promise of an aggregate increase of $200,000 during the year that will end next April."

Portland & Rochester.

The annual meeting of this company was held in Portland, Me., October 2. The earnings of the last year show an increase of $45,991, or more than 50 per cent. over the previous year. Much new iron has been laid, the bridges have been repaired and the road-bed is now in very good condition. The rolling-stock has been increased, but is still insufficient, and much business has been lost from want of transportation facilities. The trains have carried 120,000 passengers and 60,770 tons of freight the past year, without accident to passengers or loss of property. The sum of $100,000 has been subscribed to the stock of the Nashua & Rochester Company, whose road is now under contract.

Elyton, Corinth & Tennessee.

This company proposes to build a railroad from Pittsburgh Landing in Tennessee, southwest about 160 miles to Birmingham, Alabama. The line, which has been surveyed, passes through a country rich in coal and iron lands, but as yet almost entirely undeveloped.

Sabula, Ackley & Dakota.

Trains are now running from Sabula, Iowa, to Viroqua, which is 70 miles from Sabula and 18 miles beyond Oxford Junction, the late terminus. It is expected that trains will run to Marion, 80 miles from Sabula, by the end of October. The company has purchased six new engines and 100 freight cars, besides 50 stock and 20 flat cars which are being built in the Western Union Shop at Racine, Wis.

St. Paul & Chicago.

The City Treasurer of Winona, Minn., has refused to pay the accrued interest on the $100,000 of city bonds issued to this road and now held by the Minnesota Railway Construction Company, on the ground that the Construction Company has not fulfilled an important part of the contract, which was that the St. Paul & Chicago Railroad should connect at Winona, by bridge or ferry, with the La Crosse, Trempelean & Prescott Railroad.

Minneapolis & State Line.

Surveys are being made for a narrow-gauge line from Minneapolis south through Farmington, Cannon Falls and Rochester to a point on the State line in Mower County, where it will connect with a proposed branch of the Iowa Eastern narrow-gauge road from McGregor.

Iowa Central.

This company, it is reported, has decided not to build the line from Wells, Minn., to Mankato this fall.

Green Bay & Lake Pepin.

The tracklayers have reached Ogdensburg, 25 miles west of New London, and it is believed that the track will be laid to Amherst, where the road crosses the Wisconsin Central, by October 15. The contract for the section of 17 miles west from the present grade at Yellow River has been let to William M. Dayton, the remaining 22 miles to Merrillon, the crossing of the West Wisconsin road, is being graded by the company. The grading to Yellow River is very nearly finished.

Berlin, Wewauyega & Lake Superior.

Engineers have commenced to survey the proposed line of this road.

Southern Minnesota.

It is rumored that this road will change hands, and Mr. James F. Joy is said to be the purchaser.

The Winona (Minn.) *Republican* of October 2 says:

"The State Railroad Commissioner is investigating the management of the Southern Minnesota Railroad Company. He has been on the line about four weeks, taking testimony in regard to the wheat monopoly and other alleged abuses, and is said to be in possession of some very damaging facts. Simultaneously with this action, it is claimed by those who ought to know, that a conference of the bondholders is now being held in New York city, to determine upon a line of action in view of the non-payment of the interest, and that ex-Governor Sherwood, who disapproves of the management, is in council with them. It seems evident that, from one or both of these sources, the company will soon be called upon to answer."

Winona & St. Peter.

The iron is laid to a point 76 miles west of New Ulm, or about 20 miles further than at last reports. It is expected that the road will be completed to De Graff, 113 miles from New Ulm, before the end of October, and to the Big Sioux River by December. Over a thousand men are at work on the road.

Appleton & New London.

The track is laid to within two miles of Appleton, Wis., but the completion of the road is delayed by a strike among the workmen.

Chicago & Superior.

The grading between Plover and Grand Rapids is completed for four miles west of Plover.

Chicago & Northern Pacific Air Line.

The contractors on this road have commenced work south of Elkhorn, Wis.

Wisconsin Central.

The machine shops at Stevens Point are going up rapidly.

Chicago & Northwestern.

The track on the extension from Menominee to Escanaba has been laid about 20 miles from Menominee, and about five miles south from Escanaba. The grading is progressing rapidly.

Sheboygan & Fond du Lac.

The county of Marquette has ordered the issue of county bonds to the amount of $50,100 for the benefit of this road, and the towns of Montello, Harris and Westfield have issued bonds to the amount of $17,500, making in all $67,600. The company has added 50 box cars and 20 flat cars to its rolling stock.

Milwaukee, Lake Shore & Northern.

Track-layers on this road have reached a point three miles north of Port Washington and about 22 miles south of Sheboygan. The bridge at Port Washington is completed and the tracklaying southward is progressing rapidly.

Paris, Neoga & St. Louis.

This company purposes the construction of a railroad from St. Louis a little north of east to Paris, Ill., about 160 miles, dividing the distance between the Vandalia Line and the Indianapolis & St. Louis Railroad, and for most of the distance it must be within eight to fifteen miles from both of these lines. At Paris it is hoped to have connection with proposed lines to complete a line to Tiffin, Ohio, there to connect with the proposed Continental Railway. Mr. A. L. Mortimer, the Chief Engineer, has made a preliminary survey of the entire line from Neoga to St. Louis, and reports a very favorable route, there being very few considerable streams, few and light rock cuttings, and much of the earthwork what is called "sidework." The company intends to begin construction at an early day. It has now a large force of engineers in the field.

Lake Superior Ship Canal.

Mr. Isaac Otis, the General Superintendent, writes us that this canal (connecting Portage Lake with Lake Superior north of the Keweenaw peninsula) is progressing finely. Already a boat has passed through. A trip from Houghton to Ontonagon is 50 miles by the new route instead of 150 by the old.

The San Francisco Railroad Subsidies.

The Mayor of San Francisco has vetoed the ordinance passed by the Board of Supervisors submitting to a vote of the people a proposition to give the Central Pacific to build a bridge at Ravenswood, 30 miles south of the city, and establish terminal stations in the city, on the ground that the ordinance was illegally passed. It is reported that a new ordinance free from the defects to which the Mayor objects will be passed, but it is believed that he will withhold it.

The Mayor has also vetoed the ordinance submitting a proposition to make a gift of $10,000,000 to the San Francisco & Colorado Railroad Company, on the ground that there is no guarantee that the company would construct the road; that it would be left free to purchase railroads already built, and so defeat the object of a subsidy which is to secure competition; also, on the general ground that all subsidies are unadvisable, and that the popular vote has ratified this view. The Board has passed this over the Mayor's veto.

Milwaukee & St. Paul.

This company are laying track now at the rate of a mile a day, and have reached a point with track-laying about 30 miles south of Milwaukee.

New Mail Routes.

The Post Office Department on the 2d inst. ordered postal service on the extension of the new branch of the Burlington & Missouri River Railroad, from Garden Grove to Leon, Iowa, 13 miles, at the rate of $403 per year.

Atlanta & Richmond Air Line.

One of the engineers writes us that the cars are now running on the western section of this road from Atlanta, Ga., northeastward 75 miles, which is 22 miles beyond the recent terminus at Gainesville, and that 25 miles more, extending it to the South Carolina line, will be completed by January. On the eastern section the cars are running from Charlotte, N. C., west by south 50 miles to the Broad River. And there is an intermediate section in northern South Carolina extending six miles east and nine miles west of Spartanburg, the northern terminus of the Spartanburg & Union Railroad. There is thus 140 miles completed of the 263 which will form the whole line. Colonel B. Y. Sage is the Chief Engineer and Superintendent, and he is credited with great energy and perseverance.

Sioux City & St. Paul.

Our Sioux City correspondent writes, September 25, as follows:

"The last rail on the Sioux City & St. Paul Railroad was laid near Lemars, Iowa, at noon to-day. In a few days regular trains will be running between this city and St. Paul, a distance of 269 miles, thus consummating a grand work of improvement which the people of the whole Northwest have looked for eagerly for years. The grant of lands to this road, ten sections to the mile, from the General Government, was made as long ago as 1858. Work was commenced at St. Paul in 1862, but the war put a stop to active operations, and in 1867 the road had only been constructed a distance of 45 miles. In that year Gen. J. H. Bishop became the Chief Engineer, and entered actively into the work. To his untiring efforts are we largely indebted for the completion of this line. Work on the Sioux City Division, extending from St. James, Minn, to Lemars, Iowa, a distance of 123 miles, began in May, 1871, and it has therefore been built rapidly. At the latter place the road unites with the Illinois Central, using their track to this city. The terms of this arrangement is not known, but it is to hold only for two years, when the St. Paul Company will undoubtedly build an independent track to this place, a distance of 25 miles."

Indiana & Illinois Central.

Very little work has been done on this line since the completion of the 30 miles across Douglas County, Ill., but it is now announced that the contract has been let for the completion of all the remainder of the Western Division by next January. This will require the construction of about 25 miles from De-

catur eastward, and 30 miles from Montezuma, Ind., westward. With this division completed the line will have access to the Brazil coal fields.

The Arcola (Ill.) *Record* says "the track of this road is laid in the poorest and cheapest manner possible."

On the contrary, the Tuscola (Ill.) *Journal* says: "Facts go to show that no railroad in the State of Illinois was ever put down in a more substantial manner." You pays your money and you takes your choice.

The contract for the construction of the road from Tuscola to Decatur has been let to C. A. Manners and the work is to begin at once.

Boston & Maine.

The freight buildings belonging to this railroad have been supplied with patent flooding pipes, by which a building can be deluged with water in a few minutes. The apparatus consists of a sort of sprinkler of white metal from two to six inches wide, which is kept hanging close to the inside of the roofs.

Vermont & Canada.

The stockholders will meet at St. Albans, Vt., on Thursday, October 17.

St. Louis, Jefferson City & Western.

This company, which is preparing to construct a line from St. Louis by way of St. Charles to Jefferson City, and thence southwestward to Fort Scott, Kan., and west from this place to Wichita, Kan., a total distance of about 400 miles, has now a large part of the grading done for the line from Jefferson City to Humboldt, Kan., part of which it acquires from other companies, whose roads when completed will form a part of its line. The grading completed is from Jefferson City westward 20 miles to the west line of Coles County, on which section tracklaying is to be begun very soon; thence to Versailles, about 20 miles further, the grading is not yet begun, but probably this will be done soon; from Versailles south by west to Warsaw, 32½ miles, the grading is done; the main line will continue from a point on the above line six miles below Warsaw, which will be at the terminus of a short spur, and the distance thence to Fort Scott, which will be on a very direct line, is about 85 miles. From Fort Scott west to Humboldt, 40 miles, there is a road-bed completed; so of 197½ miles of line, 92½ are graded. The ties are ready on the Coles County section of 20 miles, and iron for it is arriving. The section from Jefferson City to St. Louis, which between Jefferson City and St. Charles will be on the north side of the Missouri, will probably not be undertaken until the other section is completed or nearly so. On the ungraded sections the counties and towns are about to vote on propositions to grant aid to the line, with every prospect of doing so to a liberal extent, the managers believe.

The line west of Jefferson City for nearly its whole extent passes through a fine prairie country, and, with exception of the 20 miles through Coles County, where the grading has been heavy and costly, the road-bed is constructed at little cost. For forty or fifty miles northeast of Fort Scott the line is pretty close to that of the Missouri, Kansas & Texas, but elsewhere it is likely to have little competition for local traffic. The Chicago & Alton has an arrangement with this company for carrying its through traffic from Jefferson City northeastward, in consideration of which it is to devote a portion of the gross earnings from this traffic to the purchase of the St. Louis, Jefferson City & Western bonds at par.

Great Western of Canada.

The company has recently been receiving tenders for the construction of six cars, divided into smoking and post-office compartments.

Announcement is made that the dividend for the first half of 1872 will be 3½ per cent., against 2½ in 1871, 2 in 1870, 1½ in 1869, and 1 in 1868. This certainly shows a most satisfactory progress.

Prices of Rails in September.

Bigelow & Johnson, of No. 48 Pine street, New York, report as follows the prices current of rails for the month of September, 1872:

	Gold.	Currency.	Import, Tons
New Rails.			
English	$75 @ 76		25,232
American		$85 @ 90	
Total import this month.			25,232
Import since January 1.			128,993
Total to date			154,215
Same time 1871			164,823
Old Rails.			
Double heads, T or Flange	$47 @ 48		
U or Bridge	Nominal.		6,895
Total import this month.			6,895
Import since January 1.			42,873
Total to date			49,768
Same time 1871			42,781

"*New Rails.*—Have been quiet and steady but without any marked activity. Prices remain as in our last circular, though some lots have been closed out for cash at a concession.

The dullness in the bond market and extreme stringency in money doubtless interfered materially to retard business in this department.

"*Old Rails.*—With an accumulating stock and light demand prices have yielded, and even at the decline there appears little disposition to operate. We estimate the stock here at about 12,000 tons, something very unusual in this article. Prices are somewhat irregular, as lots in store are held quite above the figures reported as accepted for lots ex-ship."

Train Run into by Horses.

The Wheeling *Intelligencer* gives an account of a runaway team in Claysville, Pa., which ran at full speed down a road and struck the middle car of a passenger train on the Hempfield Railroad, breaking through the panels with the pole of the wagon and the horses heads. One of the horses swung around and had his feet cut off by the car wheels, and both of them were instantly killed. The pole came into the car very close to a passenger, and all in the car, we may believe, were very much astonished at the sudden apparition.

Memphis & Northwestern.

A correspondent writes to correct any errors which have been or are likely to be made by confounding this company with "Memphis, Carthage & Northwestern" Company. The latter has a road in operation from Pierce City, Mo., on the Atlantic & Pacific Railroad, northwestward to Carthage, Mo., and the corporation was formerly known as the "Carthage Branch." The proposed extension of this road is from Carthage nearly due west through Columbus, Oswego and Independence, Kan. The "Memphis & Northwestern" Railroad Company, which complains that the other company has usurped its title with the intention of getting its subsidies, purposes to construct a railroad from Memphis, Tenn., "northwest through Arkansas, embracing in its route the great pine and mineral regions of the State; thence on the same course through the southwest corner of Missouri and through Kansas to Salina, on the Kansas & Pacific road, a distance of 580 miles." Our correspondent informs us that the section now under construction from Columbus west to Thayer, 42 miles, is being built by the Memphis & Northwestern, and not by the Memphis, Carthage & Northwestern. He also writes that the company has made a preliminary survey of the whole line, and is locating it as fast as circumstances permit; also, that the subsidies voted and being voted amount to more than a million of dollars, and that a contract with English capitalists has been entered into to furnish the money necessary to construct and equip the entire line.

Pittsburgh, Fort Wayne & Chicago.

In the Fort Wayne shops, as we learn from Mr. Boon, the Master Mechanic, this company is building six new freight cars daily, keeps two passenger coaches under way and keeps up the repairs. The machine shops, it is expected, will turn out fifteen new locomotives this year besides keeping up the repairs. On the 1st of September there were shipped from these shops two entirely new locomotives with 16x24 in. cylinders and steel boilers for the Texas & Pacific Railroad. All the engines built in these shops now have steel boilers, and there are fifteen such now in service on the road and all doing well.

Union Pacific.

The sales of land in August were 11,748.81 acres, at an average rate of $5.09 per acre, amounting to $59,915.85. During the month $126,000 of land-grant bonds were cancelled. The total sales to the end of August were 614,307.87 acres at the average rate of $4.22 per acre, amounting to $2,593,223.43. The company has yet unsold 11,465,692.13 acres. Of the total issue of $10,400,000 of land-grant bonds, at the end of August $1,101,000 had been cancelled by the Land Department and $1,352,000 bought by trustees. The company has land notes the principal of which amounts to $1,277,012.04.

Savannah & Memphis.

The contract for ten miles of the road, from Dadeville, Ala., the present terminus, northwest to Youngville, has been let, and work will begin at once.

Jackson, Lansing & Saginaw.

The Detroit *Tribune* says: "The company have sold 21,819 acres of their land grant, for the sum of $9.85 per acre. The sales for August, which were the largest of any one month, amounted to 9,788 acres, the company realizing therefor the sum of $95,127. The whole amount of lands in the grant from the General Government, besides the 240 sections earned and patented to the old Amboy, Lansing & Traverse Bay Railroad Company for building the road from Lansing to Owosso, aggregates something over 610,000 acres. The Jackson, Lansing & Saginaw Company have received from the General Government, in seven different patents, an aggregate of 348,433 acres, leaving something over 263,000 acres to be patented. During the present year the company will apply for another patent, which will embrace more lands than any one yet granted. It is confidently expected that the road will be completed to Otsego Lake, 120 miles northwest of Bay City, by the close of this year."

Davenport & St. Paul.

The St. Paul *Press*, of September 24, says: "The company have procured iron enough to complete the road to the State line, and are now laying track at the rate of three-fourths of a mile per day. They expect to complete the road to Rochester some time in October, 1873. The towns along the line are exceedingly anxious that the completion of this important road should be hastened, and are increasing their already large bonuses. The town of Frankfort, in Mower County, has increased its bonus $5,000, and Spring Valley has made its bonus larger by $6,000. The citizens of Pine Island will give $12,000, and possibly $30,000, while Zumbrota is negotiating to transfer the bonus of $4,000 voted by them to the Dubuque & St. Paul road three years ago to this road."

Elizabethtown & Paducah.

The report for the year ending May 31, 1872, announces the completion of 88 miles of road during the year, leaving but four miles at that time to be completed. Of $2,103,000 of the company's mortgage bonds in its hands the year previous, only $18,000 remained, but of $1,009,900 of county bonds held at that time, the company retained $632,000, looking to an improvement in their value as soon as the contractors who have been receiving them for their work have ceased to overload the market with them. Individual stockholders owed the company $81,742.42 on their subscription, which it was intended to collect immediately to meet the September interest and assist in equipping the road. The company had bought 13¾ acres in Paducah and 30 in Elizabethtown for station, yards and shops. A considerable expenditure was still necessary to put into good and safe condition the new part of the road between Paducah and Nortonville. On the part of the road between Elizabethtown and Nortonville, which had been open a year, the traffic had been less than was expected, but new coal mines have been opened on the line since; and these, and the opening of a new outlet for the coal, at Paducah, were expected to increase traffic, and something is hoped from the completion of the Owensboro & Russellville Railroad from the Ohio to a junction with their road and from the approaching connection of the Paducah & Memphis road to Memphis.

A survey of a branch line from the main line at Litchfield northwestward by the way of the mouth of Salt River and Grahamton to Louisville, 65 miles, was submitted, the cost being estimated at $1,500,000.

The following report was submitted by the Treasurer:

Construction		$4,689,043 29
Motive power and rolling stock		220,593 59
Interest and discount		595,668 66
Litchfield survey		6,087 85
Profit and loss		17,925 41
Total		$5,589,318 80
Cash		45,750 03
County bonds on hand		132,000 00
L. & N. R.R. stock	$12,207 00	
Bills receivable	2,456 45	
Real estate	5,183 94	
Shop and fuel stock	6,630 98	
		26,478 37
Due by counties		86,213 51
Due by sundry persons		2,121 78
Due by stockholders		81,749 42
Total		$6,463,634 91
Capital stock		$3,107,050 00
First-mortgage bonds		2,982,000 00
Bills payable		148,877 17
Due Drexel, Morgan & Co. for rails		177,632 20
Due contractors (reserve account)		44 605 54
Due sundry persons		2,670 42
Due Grayson County		759 58
Total		$6,463,634 91

Ripley Railroad.

This narrow-gauge railroad, completed recently from Middleton, Tenn., on the Memphis & Charleston Railroad, south 25 miles to Ripley, Miss., all but a few miles being in Tippah County, Miss., was only organized in September, 1871. The location of the line was begun last December, and the grading February 1. The road is of 3-feet gauge, and the rails weigh 35 pounds per yard. The road is equipped with two locomotives built by Dawson & Bailey, of Connellsville, Pa., one first-class and two second-class passenger cars, built by the Jackson & Sharp Company, and with one baggage, one post-office, one express car, eight box and 12 flat cars. The stations are: Middleton, Tenn., at the junction with the Memphis & Charleston, four miles north of the Mississippi line; Hopkinsville, nine miles south; Falkner, seven miles south of Hopkinsville, and Ripley, nine miles south of Falkner. Local subscriptions were made to the amount of $60,000, about $20,000 of which is said to have been by negroes, who worked out their subscriptions on the road. There is one grade of 106 feet per mile on the line. Colonel W. C. Falkner has been the President and leading manager of the enterprise from the beginning. The company hopes at some time to extend its road south to the gulf at Mississippi City.

Toronto, Grey & Bruce.

The half-yearly report of this Canada company has just been published. The road, which is of 3ft. 6in. gauge, extends from Toronto west to Mount Forest, a distance of 88 miles, and an extension from Mount Forest to Teeswater, 38 miles, and a branch from Orangeville to Owen Sound, on Georgian Bay, 68 miles, are now under construction. The receipts from traffic during the half-year ending June 30 were $64,312.46; and the expenditures, other than for new construction, were $44,649.33, or 69 per cent. of the gross earnings, making the net earnings $19,663.13. That portion of the road from Mount Forest to Orangeville has been under construction the whole time, and trains have been run on it only for the accommodation of the public, but the expenses and earnings have been included in the general statement. The net earnings are sufficient to pay the interest on the entire issue of bonds from Toronto to Orangeville and more than half the issue from Orangeville to Mount Forest. The whole amount expended in construction up to June 30, 1872, was $1,804,323.63. A contract has been made for the construction of the first section of the Gray Extension, from Mount Forest to Wroxeter, 22 miles. The whole amount of iron for the Gray Extension, some 5,000 tons in all, was secured before the late rise in iron, thus saving a large amount to the company. The townships on this extension have all voted bonuses to the road, and the Government of Ontario has granted $76,000, or $2,000 per mile for the work. This grant the company hope to have increased to $3,000 per mile, in consideration of the rough nature of the country. The Government has also granted $230,000 to be applied to that part of the road from Orangeville to Harriston. The directors had hoped to have the line to Owen Sound ready for traffic in January next, but will be unable to do so, owing to the delay in obtaining locomotives from England.

Piedmont & Potomac.

A correspondent of the Baltimore *Sun* says: "During the past summer the engineers of the Piedmont & Potomac Railroad Company have been engaged in this section surveying a route for the proposed road across the Blue Ridge. According to the terms of the charter the road is to leave the Potomac River at or near Georgetown, cross the Blue Ridge at Thornton's Gap, pass through Luray in Page County, and move on to Staunton. The city of Washington, it will be remembered, voted to accept $600,000 of the bonds of the company when the latter shall have expended $1,000,000. Up to the beginning of the survey the idea of passing the great barrier of the Blue Ridge in this quarter without a tunnel was looked upon by many as preposterous. But the engineers have surveyed and staked off a route along the side of the ridge from the vicinity of Flint Hill, for a distance of ten or twelve miles up a grade of fifty feet to the mile, through Thornton's Gap, where a fifty feet cut is to be made; then for about twenty-five miles along the western side of the ridge, on a grade of only twenty feet to the mile, down to Conrad's Store, in Rockingham County. This, however, will not take the road to Luray, in accordance with the term of the charter, but this difficulty, it is proposed, will be met by the construction of a branch road to that place."

Such a road connecting with the Chesapeake & Ohio at Staunton would give the latter a direct outlet to Baltimore and the northeast, which, we believe, will soon be indispensable to it, at least if it completes the system of connecting roads in Kentucky and Ohio, which are now contemplated.

Cairo & Vincennes.

The construction of this railroad, which was commenced by Winslow & Wilson in March last, is being pushed forward very rapidly. The grading, with the exception of the tunnel, is about completed, some of it having been done a few years ago. The superstructure is being laid on the bridge over the Wabash and will be completed at the rate of one pier weekly until November 20, when the whole will be finished.

Eighty-five miles of track, mainly between Vincennes and Tunnel Hill, have been laid, and the entire railroad will be finished in November.

There is much difficult work on this line, it being not through the level prairies which form most of the surface of Illinois, but in the broken and wooded country of the southern end of the State, and everywhere near the Ohio or the Wabash, thus crossing the tributaries of those streams near their mouths where they and their bottom lands are widest. The maximum grades are fifty feet to the mile, and there are considerable heavy earthwork and some tunnelling and some heavy bridge work. The construction of a line of this character, 160 miles long, within eight or nine months, will be a notable instance of rapid work which will do credit to the contractors.

Welland Railway.

This company, which has a railroad about 25 miles long from Port Colborne on Lake Erie, along the line of the Welland Canal to Port Dalhousie on Lake Ontario, has just published its annual report for the year 1871. The gross receipts were $105,517.47, as against $73,734.08 the previous year, being an increase of $31,783.39, or 43 per cent. Of the gross receipts, $75,561.06, or about three-fourths of the whole, was for through freight and elevating grain. The expenses were $77,795.65, against $76,096.76 the previous year, being an increase of $1,698.89, or 2¼ per cent. These was a loss of $2,281.37 on United States currency, leaving the net earnings of $25,440.45 against the deficit of $2,362.68 the previous year. During 1871 the receipts of grain were derived from:

	Bushels.
79 vessels with through cargoes containing	1,578,481
18 vessels for local millers	342,930
268 vessels lightered	1,048 983
Total number of bushels	2,970,394
Thus disposed of,	
Shipped at Port Dalhousie	2,970,688
Less quantity in store from 1870	49,054
	2,921,634
Shipped at Thorold	18,882
In store at Port Dalhousie	29,878
	2,970,394

The above is an increase over the quantity carried in 1870 of 1,083,635 bushels, viz.: in through grain 876,149 bushels and in lighterages, 332,567 bushels; but the grain carried for local millers is less by 154,081 bushels than the previous year, owing to the bountiful harvest in this neighborhood enabling millers to obtain a large portion of their supplies without importation. The number of barrels of flour carried in 1871 was 123,073, being an improvement over 1870 of 37,295 barrels. This large gain is mainly owing to the increase in lighterage by steamers passing through the Welland Canal. The passenger and local freight traffic has shown a fair increase. The rolling stock has been placed in better condition and the permanent way in fair order. The receipts from the company's propellors were $61,572.96, and the expenses, including the loss on American currency, were $55,054.66, leaving a net profit of $6,518.30 on this branch of the company's business.